RRB NTPC (UG) CBT-I Official Paper (Held On: 22 Aug, 2025 Shift 3) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. China deployed a sophisticated Large Phased Array Radar (LPAR) system near the _____ raising concerns over increased surveillance capabilities.

(a) India-Bangladesh border
(b) India-Nepal border
(c) India-Bhutan border
(d) India-Myanmar border

Q2. What is the correct order of the three-tier Panchayati Raj structure from bottom to top in India?

(a) Panchayat Samiti – Gram Panchayat – Zila Parishad
(b) Gram Sabha – Gram Panchayat – Zila Parishad
(c) Gram Panchayat – Panchayat Samiti – Zila Parishad
(d) Zila Parishad – Panchayat Samiti – Gram Panchayat

Q3. How did the Industrial Revolution alter the British economic interests in India?

(a) From taxes to feudal rule
(b) From plantations to nomadic life
(c) From control to cultural ties
(d) From trade to industry and raw material use

Q4. Which among the following South Indian kingdoms is known for the conquest that crossed the river Ganga in the north?

(a) Pandyas
(b) Pallava
(c) Chalukya
(d) Chola

Q5. Which chemical process results in the formation of plaque on copper, the rusting of iron and the blackening of silver?

(a) Flocculation
(b) Extrusion
(c) Corrosion
(d) Encapsulation

Q6. Which of the following sectors employed the largest share of India's population before independence?

(a) Industry
(b) Agriculture
(c) Services
(d) Trade

Q7. Which type of rural settlement is most common in the northeastern states and Northern Plains of India?

(a) Dispersed
(b) Semi-clustered
(c) Hamleted
(d) Clustered

Q8. Which of the following players was awarded with National Sports award 2024 in the field of Para-Badminton in January 2025?

(a) Nithya Sre Sumathy Sivan
(b) Saina Nehwa
(c) PV Sindhu
(d) S Muralidharan

Q9. Which of the following correctly describes the impact of 1991 reforms on agricultural exports?

(a) Export promotion was encouraged through de-regulation
(b) Export restrictions were imposed to ensure food security.
(c) Agricultural exports were completely banned.
(d) Only wheat and rice were allowed for export.

Q10. Which of the following are main subsystems of the Central Processing Unit (CPU)?

(a) Arithmetic Unit, Memory Unit and Output Unit
(b) Control Unit, Arithmetic Unit and Logic Unit
(c) Arithmetic Unit, Graphics Unit and Control Bus
(d) Logic Unit, Input Unit and Storage Unit

Q11. Which law is most frequently applied when calculating the electric field, particularly when high symmetry is present?

(a) Faraday's Law
(b) Coulomb's law
(c) Gauss's Law
(d) Lenz's Law

Q12. Which of the following refers to the newer and younger deposits of the floodplains in the Northern Plains of India, which are renewed almost every year and are therefore very fertile?

(a) Terai
(b) Bhangar
(c) Kankar
(d) Khadar

Q13. Which of the following athletes set a new record in triple jump with a 15.66 m leap at the 2025 Khelo India Youth Games in May 2025?

(a) Qadir Khan
(b) Animesh Kujur
(c) Tushar Chaudhary
(d) Sheikh Zeeshan

Q14. Which of the following groups is provided support under the One-Stop Centre (OSC) scheme?

(a) Only women from a specific caste or religion
(b) Only women working in government offices
(c) Only married women in urban areas
(d) All women and girls below 18 years of age affected by violence

Q15. Exercise Desert Hunt 2025, an integrated tri-service special forces exercise was conducted by the Indian Air Force at which of the following stations?

(a) Airforce station at Jodhpur
(b) Airforce station at Gandhi Nagar

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(c) Airforce station at Prayagraj
(d) Airforce station at Agra

Q16. Who was awarded the Major Dhyan Chand Khel Ratna Award in 2025 for his leadership in Indian hockey?
(a) Rupinder Pal Singh
(b) PR Sreejesh
(c) Manpreet Singh
(d) Harmanpreet Singh

Q17. Which Amendment of the Citizenship Act introduced the provision that an illegal migrant cannot acquire citizenship by naturalisation or registration?
(a) 2015 Amendment
(b) 1986 Amendment
(c) 2005 Amendment
(d) 2003 Amendment

Q18. The Santhal Revolt of 1855-56 was against which groups along with the British officials?
(a) Zamindars and moneylenders
(b) French traders
(c) Afghan invaders
(d) Marathas and Nawabs

Q19. According to the report titled “India Revives Rs. 44,000 Crore Plan to Boost Defence Manufacturing”, published in 2025, what is the primary purpose of this plan?
(a) Enhancing cyber defence capabilities
(b) Safeguarding ports and trade routes
(c) Developing fifth-generation fighter jets
(d) Acquiring advanced radar systems

Q20. Which Act first recognised the political and administrative functions of the East India Company in India?
(a) Charter Act 1813
(b) Pitt’s India Act 1784
(c) Government of India Act 1858
(d) Regulating Act 1773

Q21. The government tracks the performance of eight core industries to monitor industrial activity. What is the approximate weight of the core industries in the Index of Industrial Production (IIP)?
(a) 30%
(b) 40%
(c) 20%
(d) 45%

Q22. In which of the following years was the monetary policy framework moved towards flexible inflation targeting and a six member Monetary Policy Committee (MPC) constituted for setting the policy rate?
(a) 1992
(b) 2016
(c) 2013
(d) 1998

Q23. You want to create a file called "Notes.txt". Which tool would you use?
(a) Calculator
(b) Paint
(c) Windows Media Player
(d) Notepad

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Q24. The Indus River system includes all of the following rivers EXCEPT:

(a) Sutlej
(b) Godavari
(c) Ravi
(d) Jhelum

Q25. Where was the 2025 Global Artificial Intelligence Summit & Awards (GAISA) held?

(a) Bengaluru International Exhibition Centre
(b) Taj Palace, New Delhi
(c) Pragati Maidan, New Delhi
(d) Bharat Mandapam, New Delhi

Q26. In May 2025, Union Home Minister Amit Shah laid the foundation stone for the permanent campus of the National Forensic Sciences University (NFSU) in Nagpur. At which location did this ceremony take place?

(a) Mouza Chicholi, Kamptee tehsil, Nagpur district
(b) Swasthi Nivas, Nagpur
(c) Vishwas Cell, Nagpur University
(d) Subhash Nagar, Nagpur

Q27. Which of the following options best defines 'Sustainable Development'?

(a) Industrialisation without any restrictions
(b) Maximising profits from natural resources
(c) Using only renewable resources
(d) Development that meets present needs without compromising future generations

Q28. The 2025 Sheikh Zayed Book Award recognised which author as the Cultural Personality of the Year?

(a) Nairithi Konduru
(b) Haruki Murakami
(c) Sophie Elmhirst
(d) Michael Crummey

Q29. In 2025, which state achieved a major infrastructure milestone with the support of Indoforeign collaboration?

(a) Gujarat
(b) Uttar Pradesh
(c) Madhya Pradesh
(d) Rajasthan

Q30. Which ISRO mission, in collaboration with JAXA, aims to explore the Moon's polar regions?

(a) Chandrayaan-4
(b) Lunar Polar Exploration Mission
(c) Shukrayaan
(d) Chandrayaan-5

Q31. In 2022, which of the following states made headlines for having discovered the oldest Iron Age site in the Indian subcontinent?

(a) Gujarat
(b) Tamil Nadu
(c) Uttar Pradesh
(d) Meghalaya

Q32. Which of the following authors penned the novel "Midnight's Children," famous for its fusion of historical narratives with elements of magical realism?

(a) Rohinton Mistry
(b) Vikram Seth
(c) Arundhati Roy

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(d) Salman Rushdie

Q33. What types of climate and vegetation characterise the Taiga natural region?

(a) Arid deserts with cactus
(b) Cold climate with coniferous forests
(c) Flood-prone swamp areas
(d) Dense tropical vegetation

Q34. In May 2025, IBM and TCS partnered with Andhra Pradesh to build the “Quantum Valley Tech Park” in _____.

(a) Srikakulam
(b) East Godavari
(c) Kakinada
(d) Amaravati

Q35. One of the largest terminals in the world, Terminal-3 of the Indira Gandhi International Airport (IGIA), was inaugurated in which year with a capacity to handle up to 40 million passengers annually?

(a) 2010
(b) 2005
(c) 2020
(d) 2015

Q36. In angiosperms, which of the following organs represents the male reproductive part of a flower?

(a) Gynoecium
(b) Petals
(c) Androecium
(d) Sepals

Q37. Yakshagana is a folk theatre form from which of the following States of India?

(a) Punjab
(b) Karnataka
(c) Tamil Nadu
(d) Gujarat

Q38. The provisions for salaries and emoluments of constitutional authorities are mentioned in which Schedule?

(a) Ninth Schedule
(b) Second Schedule
(c) Seventh Schedule
(d) Third Schedule

Q39. Which state has special constitutional provisions to protect its tribal customs and laws under Article 371A?

(a) Assam
(b) Nagaland
(c) Mizoram
(d) Tripura

Q40. The world's first Pandemic Agreement was adopted during which session of the World Health Assembly held in May 2025?

(a) 77th World Health Assembly
(b) 76th World Health Assembly
(c) 78th World Health Assembly
(d) 79th World Health Assembly

MATHEMATICS

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Q41. 4 times the present age of P exceeds the present age of Q by 19 years. After 5 years, 3 times the age of Q will be 27 years less than 9 times the age of P. The present age of Q is (in years):

(a) 63
(b) 58
(c) 66
(d) 61

Q42. Simplify: $(1 + \cot^2 A) + (1 + 1/(\cot^2 A))$

(a) $\sin^2 A \cos^2 A$
(b) $\tan^2 A$
(c) $\text{cosec}^2 A \sec^2 A$
(d) $\cot^2 A$

Q43. P, Q and R invest a sum in the ratio of 59 : 14 : 72, respectively. If they earned a total profit of Rs. 4,790 at the end of the year, what is the difference between the shares of Q and R?

(a) Rs. 2,022
(b) Rs. 1,836
(c) Rs. 1,966
(d) Rs. 1,916

Q44. The value of $\sqrt{121}+\sqrt{0.0196}-\sqrt{8.41}$

(a) 6.03
(b) 15.54
(c) 8.24
(d) 8.55

Q45. Find the perimeter of a semicircle with a radius of 7 cm. (Use $\pi = 22/7$)

(a) 22 cm
(b) 25 cm
(c) 36 cm
(d) 28 cm

Q46. Anjani can do a certain piece of work in 30 days. Anjani and Khushbu can together do the same work in 10 days, and Anjani, Khushbu and Sushmita can do the same work together in 9 days. In how many days can Anjani and Sushmita do the same work together?

(a) 44/2
(b) 49/2
(c) 45/2
(d) 38/3

Q47. The number of prime numbers lying between 488 and 494, both included, is:

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

Q48. Find the surface area of a sphere whose diameter is equal to 54 cm

(a) 3865π cm²
(b) 2386π cm²
(c) 3651π cm²
(d) 2916π cm²

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Q49. The income of Raman is Rs. 86,400. He saves 22.5% of his income. If his income increases by 22% and expenditure increases by 25%, then his savings will:

(a) decrease by Rs. 2,271
(b) increase by Rs. 2,268
(c) increase by Rs. 2,273
(d) decrease by Rs. 2,263

Q50. Diya has to reach Surat which is 811 km away in 14 hours. His starting speed for 5 hours was 91 km/hr. For the next 84 km his speed was 84 km/hr. By what speed he must travel now so as to reach Surat in the decided time of 14 hours?

(a) 38 km/hr
(b) 39 km/hr
(c) 35 km/hr
(d) 34 km/hr

Q51. Find the simple interest (in Rs.) on Rs. 4,000 at 7.5% per annum rate of interest deposited on 5 February 2024 and withdrawn on 6 April 2024.

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

Q52. A number, when increased by 60%, gives 3600. The number is:

(a) 4500
(b) 6750
(c) 2250
(d) 1125

Q53. The average of first 165 even numbers is

(a) 166
(b) 167
(c) 165.5
(d) 166.5

Q54. An article is marked for Rs. 720. If two successive discounts of 10% and 15% are allowed for sale, then the selling price of the article is:

(a) Rs. 597.60
(b) Rs. 550.80
(c) Rs. 468
(d) Rs. 489.60

Q55. What sum of money (in Rs.) will amount to Rs. 2,400 at 5% per annum simple interest in 4 years?

(a) Rs. 1,950
(b) Rs. 2,000
(c) Rs. 12,000
(d) Rs. 2,050

Q56. The average price of three items of furniture is Rs. 16,005. If their prices are in the ratio 3 : 5 : 7, the price of the cheapest item (in Rs.) is:

(a) 9,603
(b) 5,335
(c) 3,201
(d) 7,469

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Q57. Anil bought some pens at the rate of Rs. 150 a dozen. He sold them for Rs. 45 each. His profit percentage is _____%.

(a) 258
(b) 260
(c) 262
(d) 264

Q58. Find the value of 83^(-2) ÷ 83^7 × 83^(-10)

(a) 83^(-19)
(b) 83^(-20)
(c) 83^(-16)
(d) 83^(-14)

Q59. The product of two consecutive positive natural numbers is 930. The greater of the two numbers is:

(a) 29
(b) 32
(c) 33
(d) 31

Q60. Simplify $x(7x - 2) + 5(x^2 - 3) + 13$.

(a) $12x^2 - 2x + 2$
(b) $-12x^2 - 2x - 2$
(c) $12x^2 - 2x - 2$
(d) $-12x^2 - 2x + 2$

Q61. Arjun and Malaika have to travel from Delhi to Kanpur in their respective cars. Arjun is driving at 66 km/hr while Malaika is driving at 99 km/hr. Find the time taken by Malaika to reach Kanpur if Arjun takes 3 hours.

(a) 2 hours
(b) 4 hours
(c) 12 hours
(d) 11 hours

Q62. An electronics retailer offers two successive discounts of 7% and 10% on a TV priced at Rs. 48,000. What is the difference in the final price after applying two successive discounts compared to applying a flat discount of 17%?

(a) Rs. 327
(b) Rs. 312
(c) Rs. 318
(d) Rs. 336

Q63. In triangle ABC, BD perpendicular to AC at D and angle DBC = 60°. E is a point on BC such that angle CAE = 20°. What is the measure of angle AEB ?

(a) 58°
(b) 50°
(c) 46°
(d) 54°

Q64. What smallest number should be added to 71079 so that the sum is completely divisible by 23?

(a) 15
(b) 13
(c) 9
(d) 14

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Q65. M and N start a business. M invests Rs. 24,000 more than N for 3 months and N invests for 4 months. M's share is Rs. 962 more than that of N, out of a total profit of Rs. 7,696. Find the capital contributed by M.

(a) Rs. 57,424
(b) Rs. 57,692
(c) Rs. 57,626
(d) Rs. 57,600

Q66. Pipe A can fill a tank in 19 hours, pipe B can fill the same tank in 21 hours and pipe C can fill the same tank in 8 hours. The time taken by them to fill the same tank if they operate together is::

(a) 4316/719 hours
(b) 13316/719 hours
(c) 10316/719 hours
(d) 11316/719 hours

Q67. Which of the following numbers divides 934725?

(a) 6
(b) 2
(c) 10
(d) 3

Q68. A shopkeeper lists the price of a fan at 50% above its cost price and offers a 30% discount on its list price. If he earns a profit of Rs. 175, then what is the list price (in Rs.) of the fan?

(a) 5,040
(b) 5,250
(c) 5,021
(d) 5,088

Q69. Find the mean proportional between 22 and 88.

(a) 47
(b) 44
(c) 46
(d) 41

Q70. The H.C.F. and the L.C.M. of two numbers are 11 and 495, respectively. If one of the numbers is 55, find the other one.

(a) 99
(b) 172
(c) 21
(d) 181

GENERAL INTELLIGENCE AND REASONING

Q71. Seven people, A, B, C, D, P, Q and R, are sitting in a row, facing north. Only three people sit to the left of R. Only A sits to the right of C. Only three people sit between C and Q. B sits at some place to the left of P but at some place to the right of D. How many people sit between D and P?

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

Q72. In a certain code language, ‘PICK’ is coded as ‘3517’ and ‘COST’ is coded as ‘2146’. What is the code for ‘C’ in the given code language?

(a) 3
(b) 1
(c) 6

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(d) 4

Q73. In a certain code language,

A # B means ‘A is the mother of B’,

A % B means ‘A is the brother of B’,

A - B means ‘A is the wife of B’ and

A @ B means ‘A is the father of B’.

How is C related to U if ‘C - O @ M # B % U’?

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

Q74. What will come in the place of the question mark (?) in the following equation, if ‘+’ and ‘×’ are interchanged, and ‘−’ and ‘÷’ are interchanged?

2 + 8 ÷ 84 − 7 × 27 = ?

(a) 15
(b) 31
(c) 26
(d) 21

Q75. In a certain code language, ‘CURE’ is coded as ‘8426’ and ‘THOU’ is coded as ‘5183’. What is the code for ‘U’ in the given code language?

(a) 4
(b) 1
(c) 8
(d) 3

Q76. In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

LUNG - UNLG - GNUL

FERN - ERFN - NREF

(a) COIR - OICR - RIOC
(b) SWAP - SAWP - PAWS
(c) BAKE - AKBE - AKEB
(d) CUTS - UCTS - SUTC

Q77. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

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

(a) ORK
(b) RUO
(c) ILF
(d) LOI

Q78. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

All laptops are computers.

Some laptops are desktops.

Conclusions:

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(I): Some computers are desktops.

(II): Some desktops are laptops.

(a) Only Conclusion I follows
(b) Only Conclusion II follows
(c) Both Conclusions I and II follow
(d) Neither Conclusion I nor II follows

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

36 + 48 × 4 ÷ 5 - 3 = ?

(a) 39
(b) 47
(c) 52
(d) 43

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

94 ? 118 142 174 214

(a) 102
(b) 106
(c) 112
(d) 108

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

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

(a) NJ-OL
(b) TP-US
(c) QM-RO
(d) KG-LI

Q82. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All Steel are Nickel.

Some Nickel are Chromium.

Conclusions:

I: Some Steel are Chromium.

II: No Chromium are Steel.

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

Q83. Samar ranked 39th from the top and 34th from the bottom in his class. How many students are there in his class?

(a) 72
(b) 74
(c) 71
(d) 73

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Q84. Ram starts his journey from point A and drives for 12 km towards the south. He then turns right and drives for 7 km. He then turns left, drives for 5 km, then again turns left and drives for 13 km, and then again turns left and drives for 9 km. He then turns left and drives for 14 km. He takes a final right turn and drives for 8 km and stops. How far (shortest distance) and in which direction should he drive in order to reach point A again? (All turns are 90-degree turns only unless specified.)

(a) 8 km towards the east
(b) 8 km towards the north
(c) 6 km towards the east
(d) 5 km towards the east

Q85. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

RXY TTV ? XLP ZHM

(a) VWZ
(b) PDM
(c) VPS
(d) SRV

Q86. Refer to the following number and symbol series and answer the question that follows.

Counting to be done from left to right only.

(Left) 0 3 # π 2 σ Ω 9 $ # 4 8 9 % 1 & 5 @ 8 6 μ (Right)

How many such symbols are there, which are immediately preceded by a prime number and also immediately followed by a symbol?

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

Q87. Teena, Beena, Meera, Leena, Meenu and Reena are sitting around a circle, facing the centre. Reena sits second to the left of Teena. Meenu sits third to the left of Reena. Leena sits second to the left of Meera. Who sits second to the left of Beena?

(a) Reena
(b) Teena
(c) Leena
(d) Meera

Q88. Select the pair that follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

EYN : FAQ

GWA : HYD

(a) JUF : KWI
(b) SBL : TEM
(c) TQH : WSI
(d) OCR : PDS

Q89. This question is based on the five, three-digit numbers given below.

(Left) 438 745 217 153 876 (Right)

(Example- 697 – First digit = 6, second digit = 9 and third digit = 7)

(NOTE: All operations to be done from left to right.)

What will be the resultant if the third digit of the highest number is added to the second digit of the lowest number?

(a) 10
(b) 12
(c) 13

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(d) 11

Q90. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) RV-MP
(b) NR-IL
(c) KO-FI
(d) IM-DH

Q91. In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.
POST - OPST - PSTO
LITE - ILTE - LTEI

(a) GANY - AGNY - GNYA
(b) HOST - OHST - OSTH
(c) VAIN - VIAN - NIAV
(d) MIND - IMND - DINM

Q92. Select the set in which the numbers are related in the same way as are the numbers of the following sets.
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
(19, 374, 14)
(47, 2230, 22)

(a) (50, 2514, 15)
(b) (27, 744, 11)
(c) (45, 2031, 2)
(d) (4, 22, 2)

Q93. What should come in place of the question mark (?) in the given series?
750 755 745 750 740 745 735 ?

(a) 740
(b) 750
(c) 735
(d) 745

Q94. Navish ranked 14th from the bottom and 17th from the top in his class. How many students are there in his class?

(a) 28
(b) 30
(c) 27
(d) 29

Q95. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, then the resultant of which of the following would be 18?

(a) 45 D 6 B 8 C 42 A 2
(b) 45 C 6 A 8 B 42 A 2
(c) 45 B 6 C 8 D 42 A 2
(d) 45 A 6 B 8 D 42 C 2

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Q96. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

DKR 79, HOV 73, LSZ 67, PWD 61, TAH 55, ?

(a) XEM 50
(b) XEL 49
(c) ZEL 51
(d) XOL 53

Q97. Vinay starts from Point A and drives 8 km towards North. He then takes a left turn, drives 4 km, turns left and drives 11 km. He then takes a left turn and drives 6 km. He takes a final left turn, drives 3 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90° turns only unless specified.)

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

Q98. Seven boxes V, W, X, Y, Z, Q and R are kept one over the other but not necessarily in the same order. Only four boxes are kept between Z and Y. Only X is kept above Z. Only two boxes are kept between W and V. R is kept immediately above Q. V is not kept immediately above R. Which box is kept fourth from the top?

(a) W
(b) R
(c) Q
(d) Y

Q99. Each of the digits in the number 8127365 is arranged in ascending order from left to right. What will be the sum of the digits that are second from the left and second from the right in the new number thus formed?

(a) 9
(b) 8
(c) 6
(d) 7

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

9 13 21 33 49 ?

(a) 69
(b) 70
(c) 75
(d) 67

ANSWER KEY

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

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SOLUTIONS

Q1. Answer: (d) India-Myanmar border

The correct answer is India-Myanmar border.

Key Points

• China has deployed a sophisticated Large Phased Array Radar (LPAR) system close to the India-Myanmar border.

• This LPAR system is capable of detecting and tracking objects over long distances, increasing concerns about surveillance and military monitoring in the region.

• The deployment of such advanced radar systems is seen as part of China's strategy to strengthen its intelligence and military capabilities near India's borders.

• The India-Myanmar border is strategically significant as it is part of India's northeastern region, which is sensitive due to security and geographical concerns.

• China's activities in this region often raise geopolitical concerns for India, particularly in terms of border security and regional stability.

Additional Information

• Large Phased Array Radar (LPAR):

• LPAR systems use advanced phased array technology to steer radar beams electronically without moving the antenna physically.

• They are primarily used for missile defense, early warning systems, and space surveillance.

• These radars can detect and track multiple targets simultaneously over vast distances.

• India-Myanmar Border:

• The India-Myanmar border stretches over 1,643 kilometers and touches four Indian states: Arunachal Pradesh, Nagaland, Manipur, and Mizoram.

• It is a porous border with significant cross-border movement due to cultural and ethnic ties between communities on both sides.

• China's Strategic Interests:

• China aims to strengthen its military presence in regions close to India as part of its broader geopolitical strategy.

• The deployment of technologies like LPAR systems is aligned with China's goal of regional dominance and intelligence gathering.

• Geopolitical Implications:

• The deployment of LPAR near the India-Myanmar border increases concerns about China's surveillance activities over Indian territory.

• It heightens tensions in the region, particularly in the context of existing disputes between India and China along the Line of Actual Control (LAC).

Q2. Answer: (c) Gram Panchayat – Panchayat Samiti – Zila Parishad

The correct answer is Gram Panchayat – Panchayat Samiti – Zila Parishad.

Key Points

• The three-tier Panchayati Raj system in India is structured as Gram Panchayat, Panchayat Samiti, and Zila Parishad from the bottom to the top level.

• Gram Panchayat is the lowest tier and functions at the village level to address local governance needs.

• The Panchayat Samiti, also known as the Block Panchayat, operates at the block level and coordinates activities between multiple Gram Panchayats.

• Zila Parishad is the top tier, functioning at the district level, and oversees the coordination and implementation of developmental programs across the district.

• The system was formalized under the 73rd Constitutional Amendment Act of 1992, which empowered rural local bodies for effective decentralized governance.

Additional Information

• 73rd Constitutional Amendment Act:

• Passed in 1992, it granted constitutional status to Panchayati Raj institutions.

• It introduced Part IX to the Indian Constitution and the Eleventh Schedule, listing 29 subjects under the purview of Panchayats.

• It also mandated the formation of Gram Sabhas and regular elections for Panchayati Raj institutions every five years.

• Gram Panchayat:

• It is composed of elected members from the village, headed by a Sarpanch.

• It is responsible for local development projects, infrastructure maintenance, and welfare programs.

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• Panchayat Samiti:
• It acts as an intermediary between Gram Panchayats and the Zila Parishad.
• Its members include elected representatives from the block and chairpersons of Gram Panchayats within its jurisdiction.
• Zila Parishad:
• It is the apex body at the district level, chaired by an elected representative.
• It provides guidance and financial resources to Panchayat Samitis and Gram Panchayats.
• Significance of Panchayati Raj:
• It promotes grassroots democracy and empowers rural citizens to participate in governance.
• It ensures better implementation of government schemes and programs at the village level.

Q3. Answer: (d) From trade to industry and raw material use

The correct answer is From trade to industry and raw material use.

Key Points

• During the Industrial Revolution, British economic interests in India shifted from simply trading finished goods to exploiting India as a source of raw materials like cotton and jute.
• The British established industries in England that required raw materials from colonies like India, leading to the development of plantation agriculture and mining in India.
• India became a supplier of raw materials for British industries and a market for British manufactured goods, leading to the decline of indigenous industries like textiles.
• The British also built infrastructure such as railways and ports, primarily to facilitate the transportation of raw materials and finished goods, serving their industrial needs.
• The economic policies were designed to benefit Britain, extracting wealth from India and suppressing its economic development.

Additional Information

• Industrial Revolution:
• Began in Britain in the late 18th century and marked a shift from agrarian economies to industrialized ones.
• Required vast quantities of raw materials, driving colonial exploitation.
• Plantation Agriculture:
• Focused on crops like cotton, jute, and indigo, which were exported to Britain.
• Disrupted traditional farming practices and led to exploitation of labor.
• Decline of Indian Textiles:
• Indian textile industry suffered as British imported cheap, machine-made goods.
• Indian artisans and craftsmen faced economic ruin due to competition with British goods.
• Infrastructure Development:
• Railways were built by the British primarily to transport goods rather than for public welfare.
• Ports like Mumbai and Kolkata were developed as trade hubs to serve British interests.
• Colonial Economic Policies:
• Policies were heavily skewed towards maximizing British profits at the expense of Indian economic growth.
• Led to widespread poverty and economic stagnation in India during British rule.

Q4. Answer: (d) Chola

The correct answer is Chola.

Key Points

• The Chola dynasty was one of the most prominent and powerful dynasties in South India, known for its military conquests and administrative capabilities.
• Under the reign of King Rajendra Chola I, the Cholas extended their empire beyond South India, with their conquests reaching the river Ganga in the north.
• Rajendra Chola I commemorated his northern campaign by assuming the title of "Gangaikonda Chola" (the Chola who brought the Ganga).
• The Cholas' conquest of northern territories also included the establishment of Gangaikonda Cholapuram as their capital city.
• The Chola empire's influence extended over South India, Sri Lanka, and parts of Southeast Asia, showcasing their dominance in the region.

Additional Information

• Rajendra Chola I:
• He was the son of Raja Raja Chola I and succeeded him as the ruler of the Chola empire.

• Rajendra Chola I expanded the empire's influence through naval expeditions, reaching as far as the Southeast Asian regions like Srivijaya.
• He is credited with building the city of Gangaikonda Cholapuram and the Gangaikonda Cholapuram temple.
• Gangaikonda Cholapuram:
• This was the capital city of the Chola empire under Rajendra Chola I after his victorious campaign in the north.
• The city was established to commemorate his success in bringing water from the Ganga River to the south.
• Chola Administration:
• The Cholas had a highly efficient administrative system with well-organized revenue collection and local governance.
• Village assemblies (sabhas) played a significant role in local administration during their rule.
• Chola Architecture:
• The Cholas are renowned for their contributions to Dravidian temple architecture, with the Brihadeeswarar Temple being a prime example.
• The architectural style emphasized grandeur, intricate carvings, and the use of granite.

Q5. Answer: (c) Corrosion

The correct answer is Corrosion.

Key Points

• Corrosion is the chemical process in which metals deteriorate due to their interaction with the environment, often involving oxidation.
• The formation of green patina (plaque) on copper, rusting of iron, and blackening of silver are examples of corrosion caused by exposure to moisture, oxygen, or sulfur compounds.
• Corrosion is typically a slow process that occurs over time, depending on the environmental conditions and the type of metal.
• Preventive measures like galvanization, painting, or coating metals are often used to protect them from corrosion.
• Corrosion can lead to significant economic losses as it damages infrastructure, machinery, and other metal-based objects.

Additional Information

• Oxidation: It is a chemical reaction where a substance loses electrons, often in the presence of oxygen, leading to the formation of oxides.
• Galvanization: A process of applying a protective zinc coating to steel or iron to prevent rusting.
• Patina Formation: Copper reacts with carbon dioxide, water, and atmospheric pollutants to form a green protective layer of copper carbonate over time.
• Rusting: Iron reacts with oxygen and moisture to form reddish-brown hydrated iron oxides, commonly known as rust.
• Silver Tarnishing: Silver reacts with sulfur compounds in the air to form black silver sulfide, leading to discoloration.

Q6. Answer: (b) Agriculture

The correct answer is Agriculture.

Key Points

• Before independence, agriculture was the primary source of livelihood for the majority of India's population.
• Around 70-75% of India's workforce was engaged in agricultural activities during the colonial period.
• The Indian economy was predominantly rural, and agriculture contributed the largest share to the national income.
• Colonial policies heavily exploited the agricultural sector, imposing high taxes and prioritizing cash crops like cotton, jute, and indigo for export.
• Despite its dominance, the sector suffered from low productivity, lack of modernization, and poverty among farmers.

Additional Information

• Colonial Impact on Agriculture:
• The British introduced zamindari and ryotwari systems, which led to high land revenue demands and exploitation of farmers.
• Shift to cash crops reduced food crop production, leading to frequent famines and food shortages.
• Infrastructure developments like railways were primarily aimed at exporting agricultural goods to Britain.
• Role of Agriculture in Pre-Independence Economy:
• Agriculture accounted for the largest proportion of India's GDP during the colonial era.
• It was the backbone of rural livelihoods, with most of the population reliant on subsistence farming.
• Challenges in Pre-Independence Agriculture:
• Lack of irrigation facilities and dependence on monsoon rains.
• Minimal use of technology or mechanization in farming practices.

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• Land fragmentation and exploitative tenancy systems further hindered agricultural progress.
• Post-Independence Agricultural Reforms:
• Introduction of the Green Revolution in the 1960s to boost productivity through modern techniques.
• Land reforms and abolition of zamindari systems aimed to improve farmers' rights.
• Development of irrigation, fertilizers, and research institutions to modernize agriculture.

Q7. Answer: (d) Clustered

The correct answer is Clustered.

Key Points

• Clustered settlements are most commonly found in fertile regions, such as the Northern Plains and the northeastern states of India.
• These settlements are characterized by houses grouped closely together, forming a compact settlement pattern.
• The close grouping of houses reflects the need for agricultural collaboration and efficient use of fertile land.
• Clustered settlements often develop near water bodies and transportation routes, facilitating irrigation, trade, and communication.
• In the northeastern states, clustered settlements are also influenced by cultural and traditional factors, promoting community living.

Additional Information

• Rural Settlement Types in India:
• Dispersed: Scattered settlements found in hilly, forested, or desert regions where resources are sparse.
• Semi-Clustered: Intermediate settlement type where houses are partially clustered due to terrain or social factors.
• Hamleted: Small clusters of houses forming distinct hamlets, often seen in regions with fragmented land holdings.
• Clustered: Compact grouping of houses in fertile plains or regions with abundant resources.
• Northern Plains of India:
• Covering states like Punjab, Haryana, Uttar Pradesh, Bihar, and West Bengal, these plains are highly fertile due to alluvial soil from rivers like the Ganga, Yamuna, and Brahmaputra.
• The agricultural economy of this region supports high population density and clustered settlements.
• Northeastern States:
• States like Assam, Meghalaya, and Nagaland exhibit clustered settlements due to traditional community living and favorable agricultural practices.
• Jhum (shifting) cultivation is a common practice influencing settlement patterns in the region.
• Key Factors Influencing Rural Settlements:
• Physical Factors: Terrain, soil fertility, availability of water, and climate.
• Cultural Factors: Traditions, religious beliefs, and social practices.
• Economic Factors: Availability of agricultural land, trade opportunities, and resource distribution.

Q8. Answer: (a) Nithya Sre Sumathy Sivan

The correct answer is Nithya Sre Sumathy Sivan.

Key Points

• Nithya Sre Sumathy Sivan was honored with the National Sports Award 2024 in the category of Para-Badminton for her outstanding performance.
• The National Sports Awards are presented annually by the Government of India to recognize exceptional contributions in sports and games.
• Para-Badminton is a category of badminton specifically designed for athletes with physical impairments, showcasing their skills and resilience.
• Recipients of the National Sports Awards are chosen based on their achievements in national and international competitions, as well as their dedication to promoting sports.
• These awards aim to encourage athletes and promote sports across diverse categories, including para-sports, in India.

Additional Information

• National Sports Awards
• The National Sports Awards include honors such as the Rajiv Gandhi Khel Ratna Award, Arjuna Award, Dronacharya Award, and Dhyan Chand Award.
• These awards recognize achievements in various sports disciplines and coaching excellence.
• Introduced in 1961, the Arjuna Award is one of the oldest and most prestigious sports honors in India.

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• The selection process for these awards involves scrutiny by expert committees appointed by the Ministry of Youth Affairs and Sports.
• Para-Badminton
• Para-Badminton is governed internationally by the Badminton World Federation (BWF).
• It features six sport classes based on the type and degree of physical impairment, including wheelchair and standing categories.
• The sport is part of the Paralympic Games, which feature competitions for athletes with disabilities.
• Para-Badminton athletes demonstrate exceptional skills, determination, and adaptability in overcoming physical challenges.
• National Sports Promotion
• The Government of India actively promotes sports through initiatives such as Khelo India and Target Olympic Podium Scheme (TOPS).
• Khelo India focuses on grassroots-level sports development and identifying talent across the country.
• TOPS provides support to elite athletes for their preparation for international competitions, including the Olympics.
• These initiatives aim to make India a global sports powerhouse by nurturing talent and providing resources.

Q9. Answer: (a) Export promotion was encouraged through de-regulation

The correct answer is Export promotion was encouraged through de-regulation.

Key Points

• The 1991 economic reforms in India included measures to liberalize trade, which encouraged export promotion and reduced restrictions on agricultural exports.
• De-regulation of agricultural exports helped farmers and agribusinesses access global markets, improving their income potential.
• Export-oriented policies were introduced to promote international trade in key agricultural commodities like spices, tea, coffee, and marine products.
• The reforms aimed to integrate the Indian economy with the global economy, resulting in increased competitiveness and diversification of agricultural exports.
• While promoting exports, certain sensitive items like staple grains (e.g., wheat and rice) were monitored to ensure food security within the country.

Additional Information

• 1991 Economic Reforms
• The 1991 reforms are often referred to as the LPG (Liberalization, Privatization, Globalization) reforms.
• They were initiated to address the balance of payments crisis and aimed to open up the Indian economy to global markets.
• Trade liberalization policies included reduced import tariffs, removal of export restrictions, and encouragement of foreign direct investment (FDI).
• Impact on Agriculture
• Agriculture became a key focus area for export diversification post-1991 reforms.
• India’s share in global agricultural trade increased, with exports of products like rice, sugar, and spices contributing significantly.
• However, challenges like price volatility in global markets and inadequate infrastructure persisted.
• Export-Oriented Policies
• Special Economic Zones (SEZs) were established to boost exports, including agricultural commodities.
• Export-Import (EXIM) policies were revised to simplify export procedures for agricultural goods.
• Export subsidies were provided for select commodities to make them competitive in global markets.
• Food Security Considerations
• While promoting exports, the government ensured food security by maintaining public distribution systems (PDS) for essential grains.
• Buffer stock norms were established to address domestic supply shortages in case of export-driven scarcity.

Q10. Answer: (b) Control Unit, Arithmetic Unit and Logic Unit

The correct answer is Control Unit, Arithmetic Unit and Logic Unit.

Key Points

• The Central Processing Unit (CPU) is the primary component of a computer that performs most of the processing.
• The three main subsystems of the CPU are the Control Unit (CU), Arithmetic Unit (AU), and Logic Unit (LU).
• The Control Unit directs the operation of the processor, including fetching instructions and directing the flow of data.
• The Arithmetic Unit handles mathematical operations such as addition, subtraction, multiplication, and division.
• The Logic Unit is responsible for logical operations like comparison (greater than, less than, equal to) and decision-making processes.

Additional Information

• Central Processing Unit (CPU):

• The CPU is often referred to as the "brain" of the computer because it executes instructions from programs.

• It interacts with other hardware components such as memory, input/output devices, and storage.

• Registers:

• Registers are small storage locations within the CPU used to temporarily hold data and instructions during processing.

• Examples include the Instruction Register (IR) and the Program Counter (PC).

• Cache Memory:

• Cache is a small, high-speed memory located inside or very close to the CPU.

• It stores frequently accessed data and instructions to speed up processing.

• Instruction Cycle:

• The CPU operates in a cycle of fetch, decode, and execute to process instructions.

• This cycle is repeated continuously to perform tasks as directed by the operating system and programs.

• Modern Enhancements:

• Modern CPUs are designed with multiple cores, enabling parallel processing for better performance.

• Features like hyper-threading and integrated graphics are commonly found in contemporary CPUs.

Q11. Answer: (c) Gauss's Law

The correct answer is Gauss's Law.

Key Points

• Gauss's Law states that the total electric flux through a closed surface is proportional to the net electric charge enclosed within the surface.

• This law is mathematically expressed as $\Phi = \int E \cdot dA = Q/\varepsilon_0$, where Φ is the electric flux, E is the electric field, dA is the area vector, Q is the enclosed charge, and ε_0 is the permittivity of free space.

• Gauss's Law is particularly useful in calculating electric fields in systems with high symmetry, such as spherical, cylindrical, or planar symmetry.

• It simplifies electric field calculations where direct application of Coulomb's law would be cumbersome.

• The law is a fundamental part of Maxwell's equations, which describe electromagnetism comprehensively.

Additional Information

• Electric Flux:

• Electric flux is the measure of the electric field passing through a surface.

• It is calculated as the dot product of the electric field and the area vector ($\Phi = E \cdot A$).

• Symmetry in Gauss's Law:

• High symmetry conditions—such as spherical, cylindrical, or planar symmetry—are essential for simplifying calculations using Gauss's Law.

• In such cases, the electric field is constant over the surface, allowing easy integration.

• Applications of Gauss's Law:

• Used to calculate electric fields of uniformly charged spheres, infinite planes, and infinitely long charged cylinders.

• Applied in understanding concepts such as electric field lines and charge distribution.

• Coulomb's Law vs. Gauss's Law:

• Coulomb's Law calculates the force between two point charges and requires summation for complex charge distributions.

• Gauss's Law is more efficient for systems with symmetrical charge distributions.

Q12. Answer: (d) Khadar

The correct answer is Khadar.

Key Points

• Khadar refers to the newer, younger deposits of the floodplains in the Northern Plains of India.

• These deposits are renewed annually by the floods, making them extremely fertile.

• Khadar soil is composed of fine silt and clay brought by rivers like the Ganga, Yamuna, Brahmaputra, and their tributaries.

• It is highly suitable for the cultivation of crops such as rice, wheat, sugarcane, and pulses due to its nutrient-rich composition.

• Khadar areas are typically found closer to riverbanks and are subject to periodic flooding.

Additional Information

• Bhangar

• Bhangar refers to the older alluvial soil deposits in the Northern Plains of India.
• It is less fertile compared to Khadar due to the presence of kankar (lime nodules).
• Bhangar soil is found in higher areas farther from riverbanks.
• Terai
• Terai is a marshy and swampy region located at the foothills of the Himalayas.
• This region is extremely fertile and supports dense vegetation and a variety of crops.
• Alluvial Soils
• Alluvial soils are one of the most fertile soil types in India, primarily found in the Indo-Gangetic Plains.
• These soils are formed by the deposition of silt brought by rivers over thousands of years.
• They are categorized into Khadar (newer deposits) and Bhangar (older deposits).
• Floodplains
• Floodplains are flat areas adjacent to rivers that are periodically inundated during floods.
• They are rich in nutrients due to the deposition of sediments by floodwaters.
• Floodplains are ideal for agriculture due to their fertility.

Q13. Answer: (d) Sheikh Zeeshan

The correct answer is Sheikh Zeeshan.

Key Points

• Sheikh Zeeshan set a new record in triple jump with a leap of 15.66 meters at the 2025 Khelo India Youth Games held in May 2025.
• The event was part of the Khelo India initiative, which aims to promote sports and talent development in India.
• Zeeshan's performance surpassed previous records, earning him recognition as one of India's promising young athletes.
• Triple jump is a track and field event where athletes perform a sequence of hop, step, and jump to achieve the longest distance.
• His achievement highlights the growing importance of the Khelo India Games in nurturing and identifying young sports talent in the country.

Additional Information

• Khelo India Youth Games
• An initiative launched by the Ministry of Youth Affairs and Sports in 2018 to encourage young athletes in India.
• The program includes talent identification, development, and financial support for emerging sports stars.
• Aims to improve India's performance in international sports events through grassroots development.
• Promotes inclusivity by providing opportunities for athletes from rural and urban areas alike.
• Triple Jump
• A track and field event where athletes execute a sequence of three movements: hop, step, and jump.
• The technique involves maintaining balance, coordination, and momentum to achieve maximum distance.
• It is governed by the rules set by the International Association of Athletics Federations (IAAF).
• The event requires both explosive power and precision to excel.
• India's Sports Development
• India has been focusing on grassroots programs like Khelo India and Target Olympic Podium Scheme (TOPS).
• Efforts include infrastructure development, professional coaching, and financial assistance for athletes.
• Recent successes in events like Tokyo Olympics have boosted India's confidence in sports.
• The government aims to make India a global sports powerhouse through these initiatives.

Q14. Answer: (d) All women and girls below 18 years of age affected by violence

The correct answer is All women and girls below 18 years of age affected by violence.

Key Points

• The One-Stop Centre (OSC) scheme is an initiative by the Government of India under the Ministry of Women and Child Development.
• It was launched in April 2015 to support women and girls affected by violence, in both private and public spaces.
• The scheme aims to provide integrated services such as medical aid, police assistance, legal aid, psycho-social counseling, and temporary shelter under one roof.
• The beneficiaries include all women and girls below 18 years of age who are victims of violence, irrespective of caste, religion, or marital status.
• One-Stop Centres are established in every district of the country and are known as Sakhi Centres.

Additional Information

• Violence against Women:

• It includes physical, sexual, emotional, psychological, and economic abuse.

• Forms of violence may include domestic violence, dowry harassment, trafficking, acid attacks, rape, and cybercrimes.

• Legal Framework:

• The OSC scheme operates under the Protection of Women from Domestic Violence Act, 2005 and other related laws.

• It ensures that women have access to legal aid and protection orders in cases of abuse.

• Implementation:

• The scheme is implemented by state governments with financial and technical support from the central government.

• Each centre works in collaboration with local law enforcement, healthcare providers, and NGOs.

• Digital Integration:

• The OSC scheme is integrated with the 181 Women Helpline, allowing victims to access support services through a single contact point.

• This ensures immediate and effective assistance to women in distress.

Q15. Answer: (a) Airforce station at Jodhpur

The correct answer is Airforce station at Jodhpur.

Key Points

• Exercise Desert Hunt 2025 is an integrated tri-service special forces exercise conducted by the Indian Air Force (IAF).

• The exercise was held at the Airforce station in Jodhpur, Rajasthan, known for its strategic significance and operational capabilities.

• This exercise is aimed at enhancing joint operational readiness and coordination among the Indian Armed Forces' special forces.

• It focuses on interoperability during combat scenarios, including counter-terrorism, hostage rescue, and high-altitude warfare operations.

• The exercise also serves as a platform to test and integrate advanced technologies and weapon systems in real-world scenarios.

Additional Information

• Tri-Service Exercises:

• These are military exercises involving the Army, Navy, and Air Force to improve joint operational synergy.

• Examples include Exercise Indra (with Russia) and Exercise Malabar (with the US, Japan, and Australia).

• Special Forces of India:

• India's special forces include the National Security Guard (NSG), Para (Special Forces) of the Army, MARCOS of the Navy, and Garud Commandos of the Air Force.

• These forces are trained for high-risk operations such as counter-terrorism, reconnaissance, and unconventional warfare.

• Airforce Station Jodhpur:

• It is one of the premier airbases of the Indian Air Force, located in Rajasthan.

• The base plays a critical role in operations due to its proximity to the western border with Pakistan.

• Importance of Joint Military Exercises:

• They help improve inter-service coordination and operational efficiency.

• Joint exercises also provide a platform to test new strategies and technologies in simulated combat scenarios.

Q16. Answer: (d) Harmanpreet Singh

The correct answer is Harmanpreet Singh.

Key Points

• Harmanpreet Singh, the captain of the Indian men's hockey team, was awarded the prestigious Major Dhyan Chand Khel Ratna Award in 2025.

• He is renowned for his exceptional skills as a drag-flicker and his leadership qualities, which significantly contributed to India's success in international hockey tournaments.

• Under his captaincy, India performed remarkably well in various tournaments, including the Asian Games and the FIH Hockey Pro League.

• The Major Dhyan Chand Khel Ratna Award is India's highest sporting honor, recognizing outstanding achievements in sports.

• Harmanpreet Singh's award highlights his remarkable contributions to the resurgence of Indian hockey on the global stage.

Additional Information

• Major Dhyan Chand Khel Ratna Award

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• The award was instituted in 1991–92 and is the highest sporting honor in India.
• It is named after Major Dhyan Chand, one of the greatest hockey players in the history of the sport.
• Recipients of this award receive a medallion, a certificate, and a cash prize.
• The award recognizes athletes for their exceptional performances over a period of four years.
• Harmanpreet Singh's Career Highlights
• Harmanpreet Singh has been an integral part of the Indian hockey team since his debut in 2015.
• He is known for his accurate drag-flicks and has scored numerous goals in international competitions.
• He led India to a bronze medal at the 2021 Tokyo Olympics, ending a 41-year Olympic medal drought in hockey.
• In addition to his technical skills, he is praised for his leadership and composure on the field.
• Indian Hockey's Resurgence
• India has seen a revival in hockey performance over the last decade, marked by consistent performances in global tournaments.
• The Tokyo 2021 Olympic bronze medal was a historic achievement for the men's hockey team.
• Continued investments in grassroots development and sports infrastructure have contributed to this resurgence.
• Major Dhyan Chand
• Major Dhyan Chand (1905–1979) is widely regarded as one of the greatest field hockey players of all time.
• He was instrumental in India's three consecutive Olympic gold medals in 1928, 1932, and 1936.
• His extraordinary goal-scoring ability earned him the nickname "The Wizard of Hockey."

Q17. Answer: (d) 2003 Amendment

The correct answer is 2003 Amendment.

Key Points

• The 2003 Amendment to the Citizenship Act introduced provisions restricting illegal migrants from acquiring Indian citizenship through registration or naturalisation.
• An illegal migrant is defined as a person who enters India without valid travel documents or stays beyond the permitted time frame.
• The amendment was brought during the tenure of the Atal Bihari Vajpayee-led NDA government.
• This amendment also laid the groundwork for the creation of the National Register of Citizens (NRC), aimed at identifying illegal migrants in India.
• The Citizenship (Amendment) Act, 2003, added Section 14A, mandating the government to issue a national identity card and maintain the NRC.

Additional Information

• Illegal Migrant Definition:
• An illegal migrant is a foreign national who enters India without valid documentation (e.g., passport, visa).
• Staying in India beyond the permitted duration also qualifies as illegal migration.
• National Register of Citizens (NRC):
• The NRC was first created in Assam to identify illegal migrants, specifically those who entered after March 24, 1971.
• The 2003 Amendment paved the way for its potential nationwide implementation.
• Citizenship (Amendment) Act, 2019:
• It amended the Citizenship Act, 1955, allowing certain persecuted minorities from Pakistan, Bangladesh, and Afghanistan to acquire Indian citizenship.
• Excludes illegal migrants who are not part of the specified religious communities.
• Modes of Acquiring Citizenship in India:
• By birth.
• By descent.
• By registration.
• By naturalisation.
• By incorporation of territory.

Q18. Answer: (a) Zamindars and moneylenders

The correct answer is Zamindars and moneylenders.

Key Points

• The Santhal Revolt was a tribal uprising that took place between 1855-56 in present-day Jharkhand and West Bengal.
• The rebellion was primarily directed against the exploitative practices of zamindars and moneylenders, who oppressed the

Santhal community through exorbitant taxes and loans.

• The British colonial officials supported the zamindars, further exacerbating the exploitation of the tribal population.

• Leaders of the revolt, Sido and Kanhu Murmu, mobilized thousands of Santhals to fight against the injustices.

• The revolt was eventually suppressed by the British forces, but it remains a significant event in Indian history as one of the earliest organized rebellions against colonial rule.

Additional Information

• Santhals:

• The Santhals are one of the largest tribal communities in India, predominantly residing in Jharkhand, Bihar, Odisha, and West Bengal.

• They have a rich cultural heritage with distinct traditions, language (Santhali), and lifestyle.

• Causes of the Revolt:

• The primary reason for the revolt was the exploitation of the Santhal community by zamindars and moneylenders through unfair taxation and loans.

• British policies, such as the Permanent Settlement, worsened the plight of the tribal population.

• Sido and Kanhu Murmu:

• These were the key leaders of the Santhal Revolt, who emerged as symbols of resistance against colonial oppression.

• They organized the tribal population and initiated the uprising in June 1855.

• Legacy of the Revolt:

• The Santhal Revolt highlighted the plight of tribal communities under British rule and their resistance against exploitation.

• It laid the foundation for subsequent tribal and peasant movements in India.

Q19. Answer: (b) Safeguarding ports and trade routes

The correct answer is Safeguarding ports and trade routes.

Key Points

• India's Rs. 44,000 crore defence manufacturing plan primarily aims at ensuring maritime security by safeguarding ports and trade routes.

• The initiative is part of a broader strategy to strengthen India's defence capabilities and protect critical infrastructure related to international trade.

• Trade routes and ports play a vital role in India's economy, contributing significantly to exports, imports, and overall GDP.

• The plan also aligns with India's objective to become a global hub for defence production under its 'Make in India' programme.

• Focused investments in strategic areas like port security are crucial to counter emerging threats such as piracy, terrorism, and geopolitical tensions in vital sea lanes.

Additional Information

• India's Defence Manufacturing Plan

• The Rs. 44,000 crore initiative is part of the government’s efforts to enhance self-reliance in defence production.

• It includes manufacturing critical equipment such as ships, submarines, and surveillance systems to boost maritime security.

• Strategic investments in this sector are expected to create jobs, attract foreign investments, and foster technological innovation.

• The plan also emphasizes collaboration with private companies and foreign entities under FDI policies to enhance capabilities.

• Importance of Ports and Trade Routes

• Ports and trade routes are vital for India’s economic growth, handling about 95% of the country’s international trade volume.

• Major ports like Mumbai, Chennai, and Kolkata serve as crucial hubs for imports and exports.

• Securing these routes ensures smooth transportation of essential goods and resources, protecting against disruptions.

• Make in India Initiative

• Launched by PM Narendra Modi in 2014, the 'Make in India' programme aims to transform India into a global manufacturing hub.

• Defence manufacturing is a key sector under this initiative, with the goal of reducing dependency on foreign imports.

• The initiative promotes indigenous production through incentives, policy reforms, and public-private partnerships.

• Geopolitical Significance of Maritime Security

• With its strategic location in the Indian Ocean, India plays a pivotal role in maintaining regional security.

• Securing maritime routes is essential to counter threats like piracy and ensure the safety of global trade.

• India’s commitment to maritime security also strengthens its position as a responsible player in global geopolitics.

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Q20. Answer: (d) Regulating Act 1773

The correct answer is Regulating Act 1773.

Key Points

• The Regulating Act of 1773 was the first parliamentary legislation by the British government to regulate the affairs of the East India Company in India.

• This Act marked the beginning of British political and administrative control in India.

• It established the position of the Governor-General of Bengal (later known as Governor-General of India) and created an executive council to assist him.

• The Act aimed to address the administrative corruption and financial mismanagement by the East India Company.

• The Supreme Court of Judicature at Calcutta was also established under this Act, marking the start of a structured judicial system in India.

Additional Information

• Charter Act of 1813

• This Act ended the trade monopoly of the East India Company, except for trade in tea and trade with China.

• It allowed missionaries to spread education and Christianity in India.

• The Act allocated funds for the promotion of education in India.

• Pitt's India Act 1784

• This Act distinguished between the commercial and political functions of the East India Company.

• A Board of Control was established to supervise the Company's political affairs in India.

• The Governor-General's authority was strengthened by this Act.

• Government of India Act 1858

• This Act abolished the East India Company's rule in India and transferred the administration to the British Crown.

• The position of the Governor-General of India was replaced by the Viceroy of India.

• It marked the beginning of direct governance of India by the British Government.

• Supreme Court of Judicature

• Established by the Regulating Act of 1773, it was the first British court in India.

• Located in Calcutta, the court had jurisdiction over British subjects and Company officials.

• It marked the foundation of the modern judicial system in India.

Q21. Answer: (b) 40%

The correct answer is 0.4.

Key Points

• The eight core industries of India have a combined weight of approximately 40.27% in the Index of Industrial Production (IIP).

• The eight core industries are Coal, Crude Oil, Natural Gas, Refinery Products, Fertilizers, Steel, Cement, and Electricity.

• These industries are considered "core" because they have a major impact on the overall industrial performance of the Indian economy.

• Refinery Products have the highest weight (28.04%) among the core industries.

• The IIP serves as a key economic indicator for tracking industrial growth and production trends in the country.

Additional Information

• Core Industries and Their Weights:

• Coal: 10.33%

• Crude Oil: 8.98%

• Natural Gas: 6.88%

• Refinery Products: 28.04%

• Fertilizers: 2.63%

• Steel: 17.92%

• Cement: 5.37%

• Electricity: 19.85%

• Index of Industrial Production (IIP):

• The IIP is a composite indicator that measures the growth rate of different sectors in the economy such as manufacturing, mining, and electricity.

• The IIP data is released monthly by the National Statistical Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI).

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• Significance of Core Industries:
• The performance of these industries is closely linked to the overall industrial health of the economy.
• Any fluctuation in the output of these industries significantly impacts the GDP growth rate.
• Role in Economic Policy:
• The government uses IIP and core industry data to frame economic policies and monitor industrial performance.
• The data also helps in assessing the effectiveness of industrial and fiscal policies.

Q22. Answer: (b) 2016

The correct answer is 2016.

Key Points

• The monetary policy framework was shifted towards Flexible Inflation Targeting (FIT) in 2016 to maintain price stability and support economic growth.
• A six-member Monetary Policy Committee (MPC) was constituted in 2016 to decide the policy interest rates based on inflation targets set by the government.
• The Reserve Bank of India Act, 1934, was amended in 2016 to provide a statutory basis for a monetary policy framework centered on inflation targeting.
• The Reserve Bank of India (RBI) and the Government of India signed an agreement in February 2015, which was operationalized in 2016 to implement the FIT framework.
• The inflation target was set at 4% with a tolerance band of ±2%, aiming to keep inflation between 2% and 6%.

Additional Information

• Flexible Inflation Targeting (FIT):
• It is a monetary policy strategy where the central bank sets an inflation target and uses interest rates and other tools to achieve it.
• The goal is to maintain price stability while supporting overall economic growth.
• Monetary Policy Committee (MPC):
• The MPC is a statutory body constituted under the RBI Act, 1934, responsible for setting the policy repo rate to achieve inflation targets.
• It consists of six members: three from the RBI (including the Governor as the Chairperson) and three external members nominated by the Government of India.
• Inflation Targeting Framework in India:
• Adopted in 2016, it mandates the RBI to target inflation at 4% with a tolerance band of ±2%.
• The framework is reviewed every five years to reassess its effectiveness and make necessary adjustments.
• Key Benefits of FIT:
• Improves transparency and accountability in monetary policy decision-making.
• Helps anchor inflation expectations, leading to stable economic conditions.
• Reduces uncertainty in the economy, promoting investment and growth.
• Challenges of FIT in India:
• High dependency on supply-side factors like food and fuel prices, which are often volatile.
• Potential trade-off between inflation control and economic growth during periods of economic slowdown.

Q23. Answer: (d) Notepad

The correct answer is Notepad.

Key Points

• Notepad is a simple text editor included with the Microsoft Windows operating system.
• It allows users to create, view, and edit plain text files, typically with a ".txt" file extension.
• Notepad is widely used for creating and editing text-based files without any formatting, such as code, configuration files, or quick notes.
• It is a lightweight and easy-to-use tool, designed for simplicity rather than advanced text formatting or design.
• Notepad supports various file encodings, including ANSI, Unicode, and UTF-8, making it compatible with different languages and systems.

Additional Information

• Plain Text:
• Plain text refers to text that contains no formatting, such as bold, italic, or underlined text.
• Files created in Notepad are saved as plain text by default, ensuring compatibility across various platforms.

• File Extensions:

• By default, files created in Notepad are saved with a ".txt" extension.

• Users can manually save files with other extensions (e.g., ".html", ".csv") to create specific types of text-based files.

• Alternatives to Notepad:

• Advanced text editors like Notepad++, Sublime Text, and Visual Studio Code offer additional features such as syntax highlighting and plugins.

• However, Notepad remains a popular choice for quick edits due to its simplicity and availability.

• Difference Between Notepad and Word Processors:

• Notepad is a basic text editor for plain text, while word processors like Microsoft Word include features for formatting, styling, and advanced document design.

• Notepad is ideal for lightweight tasks, whereas word processors are used for creating professional documents.

Q24. Answer: (b) Godavari

The correct answer is Godavari.

Key Points

• The Indus River system consists of the rivers Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej, which mostly flow through the northern regions of India and Pakistan.

• The Godavari is not part of the Indus River system; it is India's second-longest river and flows primarily through central and southern India.

• The Godavari originates from Trimbakeshwar in Maharashtra and empties into the Bay of Bengal.

• The Indus River system is governed by the Indus Waters Treaty of 1960 between India and Pakistan, focusing on the allocation of the river's waters.

• The rivers Sutlej, Ravi, and Jhelum are key tributaries of the Indus, contributing significantly to its water flow.

Additional Information

• Indus River System:

• It originates from the Tibetan Plateau near Lake Mansarovar and flows through India and Pakistan before reaching the Arabian Sea.

• The Indus is one of the longest rivers in the world, spanning over 3,180 km.

• Its tributaries include Jhelum, Chenab, Ravi, Beas, and Sutlej, which are primarily located in northern India.

• The Indus Basin supports agriculture and hydroelectric projects in the region.

• Godavari River:

• The Godavari is India's second-longest river after the Ganges, with a length of about 1,465 km.

• It flows through Maharashtra, Telangana, Andhra Pradesh, Chhattisgarh, and Odisha.

• It is often referred to as 'Dakshin Ganga' (Ganges of the South).

• Major tributaries include Pranhita, Indravati, Sabari, and Manjira.

• Indus Waters Treaty:

• Signed in 1960 between India and Pakistan under the mediation of the World Bank.

• It divides the control of the six rivers in the Indus system; India gets the eastern rivers (Ravi, Beas, Sutlej), while Pakistan gets the western rivers (Indus, Jhelum, Chenab).

• This treaty has been considered a successful example of water-sharing agreements between nations.

• Significance of River Systems in India:

• River systems in India are vital for agriculture, drinking water, and hydroelectric power generation.

• They play a significant role in cultural and religious practices.

• Proper management and conservation of river systems are crucial for sustainable development.

Q25. Answer: (d) Bharat Mandapam, New Delhi

The correct answer is Bharat Mandapam, New Delhi.

Key Points

• The 2025 Global Artificial Intelligence Summit & Awards (GAISA) was hosted at Bharat Mandapam, New Delhi, a prominent venue for global events in India.

• GAISA is a significant event that brings together global leaders, policymakers, and experts to discuss advancements in the field of Artificial Intelligence (AI).

• The summit focuses on exploring AI-driven solutions for challenges across industries such as healthcare, education, agriculture, and governance.

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• It serves as a platform for showcasing cutting-edge AI technologies and fostering collaboration between nations and organizations.

• GAISA also recognizes contributions to AI research and development through its prestigious awards program, acknowledging exceptional innovations and achievements in the field.

Additional Information

• Bharat Mandapam

• Bharat Mandapam is a state-of-the-art international convention and exhibition center located in Pragati Maidan, New Delhi.

• It was inaugurated by Prime Minister Narendra Modi and is designed to host global summits, exhibitions, and cultural events.

• The venue is equipped with world-class facilities, including advanced technology setups for conferences and exhibitions.

• Artificial Intelligence (AI)

• AI refers to the simulation of human intelligence in machines programmed to perform tasks such as learning, problem-solving, and decision-making.

• Applications of AI span across various sectors, including healthcare, finance, transportation, and education.

• Key subfields of AI include machine learning, natural language processing, computer vision, and robotics.

• Global AI Trends

• AI is being increasingly used for predictive analytics, automation, and personalized services.

• Ethical AI and responsible AI development are gaining attention globally to ensure fair and unbiased outcomes.

• The integration of AI with emerging technologies like IoT, blockchain, and 5G is shaping the future of innovation.

• India's Role in AI Development

• India is focusing on AI adoption under the National AI Strategy, "AI for All," to leverage its benefits for inclusive growth.

• Initiatives like the National AI Portal and collaborative projects with global tech companies are driving AI research and development in the country.

• The Indian government is also investing in skill development programs to prepare its workforce for AI-driven industries.

Q26. Answer: (a) Mouza Chicholi, Kamptee tehsil, Nagpur district

The correct answer is Mouza Chicholi, Kamptee tehsil, Nagpur district.

Key Points

• Union Home Minister Amit Shah laid the foundation stone for the permanent campus of the National Forensic Sciences University (NFSU) in Nagpur in May 2025.

• The ceremony was held at Mouza Chicholi, located in Kamptee tehsil of Nagpur district, Maharashtra.

• The National Forensic Sciences University (NFSU) is a globally renowned institution specializing in forensic sciences and allied fields.

• This development aligns with the government's focus on strengthening forensic capabilities and criminal investigation infrastructure in India.

• The establishment of a permanent campus in Nagpur is aimed at providing advanced forensic education and research opportunities for students and professionals.

Additional Information

• National Forensic Sciences University (NFSU)

• The NFSU was established in 2020, replacing the Gujarat Forensic Sciences University.

• It is the world's first dedicated university for forensic sciences and related disciplines.

• NFSU operates under the Ministry of Home Affairs, Government of India.

• It offers undergraduate, postgraduate, and doctoral programs in forensic sciences, cybersecurity, criminology, and allied areas.

• Forensic Sciences

• Forensic science involves the application of scientific methods to solve crimes and analyze evidence.

• Key areas include forensic biology, chemistry, toxicology, digital forensics, and fingerprint analysis.

• It plays a crucial role in criminal investigations, legal proceedings, and ensuring justice.

• Nagpur's Strategic Importance

• Nagpur is a major city in Maharashtra and is centrally located in India.

• It is known for its educational institutions, industries, and role as a logistics hub.

• The establishment of NFSU's campus in Nagpur is expected to boost regional development and academic advancements.

• Government's Initiative on Forensic Education

• The Indian government is emphasizing the development of forensic science education to strengthen crime detection capabilities.

• Institutions like NFSU contribute to building skilled professionals in the field of forensics, aiding law enforcement agencies

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nationwide.

Q27. Answer: (d) Development that meets present needs without compromising future generations

The correct answer is Development that meets present needs without compromising future generations.

Key Points

• Sustainable development refers to the practice of meeting current human needs while ensuring that natural resources and ecosystems are preserved for future generations.

• The concept was popularized by the Brundtland Commission in its 1987 report "Our Common Future."

• Sustainable development encompasses three main pillars: economic growth, environmental protection, and social inclusion.

• It emphasizes the need to balance economic progress with environmental sustainability and equity.

• The United Nations (UN) has outlined 17 Sustainable Development Goals (SDGs), which serve as a global framework for achieving sustainable development by 2030.

Additional Information

• Brundtland Commission:

• Also known as the World Commission on Environment and Development (WCED), it was established by the UN in 1983.

• Its 1987 report, "Our Common Future," provided the most widely recognized definition of sustainable development.

• Sustainable Development Goals (SDGs):

• The SDGs are a set of 17 global goals adopted by the UN in 2015 to address critical issues like poverty, inequality, and climate change.

• Examples include Goal 13: Climate Action and Goal 12: Responsible Consumption and Production.

• Key Principles of Sustainability:

• Intergenerational equity: Ensuring resources are available for future generations.

• Precautionary approach: Taking proactive measures to prevent environmental degradation.

• Examples of Sustainable Practices:

• Using renewable energy sources like solar and wind power.

• Promoting sustainable agriculture and resource-efficient industries.

• Implementing waste reduction and recycling programs.

Q28. Answer: (b) Haruki Murakami

The correct answer is Haruki Murakami.

Key Points

• Haruki Murakami, the renowned Japanese author, was recognised as the Cultural Personality of the Year in 2025 by the Sheikh Zayed Book Award committee.

• The Sheikh Zayed Book Award is one of the most prestigious literary awards in the Arab world, aiming to celebrate intellectuals, writers, and publishers.

• Murakami is celebrated for his unique storytelling style, blending surrealism, magical realism, and deep human emotions in his works.

• Some of his famous works include "Norwegian Wood," "Kafka on the Shore," and "1Q84."

• This recognition further cements Murakami's global influence and contribution to contemporary literature.

Additional Information

• Sheikh Zayed Book Award

• Named after Sheikh Zayed bin Sultan Al Nahyan, this award honours contributions to Arabic culture, language, and literature.

• The award comprises nine categories, including Literature, Translation, and Cultural Personality of the Year.

• The Cultural Personality of the Year award recognises individuals or organisations for their significant contributions to Arab culture and thought.

• Winners receive a gold medal, a certificate of merit, and a monetary prize.

• Haruki Murakami's Literary Style

• Murakami's works often explore themes of loneliness, existentialism, and the human condition.

• His writing blends elements of Western and Japanese literary traditions.

• He is known for his deep character development and use of music and pop culture references in his storytelling.

• Global Impact of Murakami

• Murakami's novels have been translated into over 50 languages, making him one of Japan's most internationally acclaimed authors.

• He has received numerous awards, including the Franz Kafka Prize and the Jerusalem Prize.

• His works have significantly contributed to bridging cultural gaps between Japan and the global literary community.
• Other Prestigious Literary Awards
• The Nobel Prize in Literature: Awarded annually for outstanding contributions in literature.
• The Booker Prize: Recognizes the best novel written in English and published in the UK/Ireland.
• The Pulitzer Prize: Celebrates excellence in journalism, literature, and musical composition in the United States.

Q29. Answer: (c) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points

• In 2025, Madhya Pradesh achieved a significant milestone in infrastructure development with the support of Indo-foreign collaboration.
• The collaboration focused on large-scale projects, including industrial corridors, smart cities, and transportation networks.
• Madhya Pradesh witnessed rapid urbanization and technological advancements due to this initiative.
• Major areas of focus included renewable energy projects, metro rail systems, and logistics hubs, enhancing connectivity and sustainability.
• The project attracted significant foreign direct investment (FDI), boosting the state's economy and creating numerous employment opportunities.

Additional Information

• Indo-Foreign Collaboration in Infrastructure:
• It refers to partnerships between Indian and foreign entities to jointly develop infrastructure projects.
• Such collaborations often bring in advanced technology, expertise, and funding from global players.
• They play a crucial role in modernizing India's infrastructure and achieving sustainable development goals.
• Industrial Corridors in India:
• Industrial corridors are regions earmarked for industrial development with robust infrastructure and connectivity.
• Examples include the Delhi-Mumbai Industrial Corridor (DMIC) and Amritsar-Kolkata Industrial Corridor (AKIC).
• These corridors aim to drive economic growth by boosting manufacturing and exports.
• Renewable Energy Projects in Madhya Pradesh:
• Madhya Pradesh is a leading state in India for renewable energy production, especially solar and wind power.
• The Rewa Solar Power Project is a prominent example of the state's renewable energy initiatives.
• These projects contribute significantly to India's commitment to achieving its renewable energy targets.
• Role of Foreign Direct Investment (FDI):
• FDI involves investment from foreign entities into domestic projects or businesses.
• It is crucial for economic growth, technology transfer, and job creation in the host country.
• India has taken several measures to attract FDI, including policy reforms and ease of doing business initiatives.

Q30. Answer: (b) Lunar Polar Exploration Mission

The correct answer is Lunar Polar Exploration Mission.

Key Points

• The Lunar Polar Exploration Mission (LUPEX) is a collaborative project between ISRO (Indian Space Research Organisation) and JAXA (Japan Aerospace Exploration Agency).
• The mission aims to explore the Moon's polar regions to study water ice and other resources essential for future lunar exploration.
• LUPEX plans to deploy a lander and rover to conduct in-depth scientific studies of the lunar polar environment.
• The primary focus of the mission is to assess the distribution and quantity of water ice in the Moon's polar regions.
• LUPEX is a key step toward enabling sustained human presence and resource utilization on the Moon.

Additional Information

• ISRO's Lunar Exploration:
• ISRO successfully launched Chandrayaan missions, including Chandrayaan-1, Chandrayaan-2, and Chandrayaan-3, to explore the Moon.
• Chandrayaan-1 confirmed the presence of water molecules on the Moon's surface.
• Chandrayaan-3, launched in 2023, successfully landed near the Moon's south pole.
• JAXA's Lunar Missions:
• JAXA has been actively involved in lunar exploration, including the SELENE (Kaguya) mission.

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• SELENE gathered critical data on the Moon's surface and gravity field.
• Water Ice Exploration on the Moon:
• Water ice on the Moon is considered a crucial resource for future human exploration and colonization.
• It can be used for drinking water, oxygen production, and rocket fuel generation.
• Importance of Lunar Polar Regions:
• Lunar polar regions are believed to contain permanently shadowed craters where water ice can remain stable.
• Exploring these areas is essential for understanding the Moon's geology and resource potential.

Q31. Answer: (b) Tamil Nadu

The correct answer is Tamil Nadu.

Key Points

• In 2022, Tamil Nadu became the focus of archaeological attention when it unearthed the oldest Iron Age site in the Indian subcontinent.
• The discovery was made in the Mayiladumparai region of Tamil Nadu.
• Carbon dating of samples from the site revealed their age to be as early as 2172 BCE, pushing the beginning of the Iron Age in India back by several centuries.
• The findings included iron tools, weapons, and pottery, shedding light on the technological advancements of the period.
• This discovery significantly contributes to understanding the prehistoric cultural and technological evolution in South India.

Additional Information

• Iron Age:
• The Iron Age is the period following the Bronze Age, marked by the widespread use of iron for tools and weapons.
• In India, the Iron Age traditionally begins around 1200 BCE, but the Tamil Nadu discovery suggests an earlier date.
• Mayiladumparai Excavations:
• Excavations in Mayiladumparai were conducted under the direction of the Tamil Nadu Department of Archaeology.
• Findings included furnaces, slag, and iron implements, indicating early metallurgical practices.
• Archaeological Significance in Tamil Nadu:
• Tamil Nadu has been a hub of archaeological discoveries, including the Sangam-era artifacts and Keezhadi excavation.
• These discoveries highlight the region's advanced cultural and technological practices in ancient times.
• Carbon Dating:
• Carbon dating is a technique used to determine the age of organic materials by measuring the decay of carbon-14 isotopes.
• It played a crucial role in dating the Mayiladumparai findings to around 2172 BCE.

Q32. Answer: (d) Salman Rushdie

The correct answer is Salman Rushdie.

Key Points

• "Midnight's Children" is a highly acclaimed novel written by Salman Rushdie, first published in 1981.
• The novel is celebrated for its innovative narrative style, blending magical realism with historical and political commentary.
• The book won the prestigious Booker Prize in 1981 and was later awarded the Booker of Bookers in 1993 and 2008, recognizing it as the best among Booker-winning novels.
• The story revolves around Saleem Sinai, a boy born at the exact moment of India's independence, whose life is intertwined with the country's post-independence history.
• Salman Rushdie is a renowned British-Indian author known for his thought-provoking works, often addressing themes like identity, culture, and political upheaval.

Additional Information

• Magical Realism
• A literary genre that incorporates magical or fantastical elements into realistic settings.
• Prominent authors in this genre include Gabriel García Márquez, Isabel Allende, and Salman Rushdie.
• It allows authors to explore complex social, historical, and political themes through symbolic and imaginative storytelling.
• Booker Prize
• A prestigious literary award presented annually for the best original novel written in English and published in the UK or Ireland.
• Established in 1969, it has become one of the most significant literary accolades globally.
• Rushdie's "Midnight's Children" remains one of the most celebrated Booker Prize-winning novels.
• Salman Rushdie's Other Works

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• Rushdie's notable works include "The Satanic Verses", "The Moor's Last Sigh", and "The Ground Beneath Her Feet".
• His writings often explore themes of identity, migration, and the intersection of Eastern and Western cultures.
• Historical Context of "Midnight's Children"
• The novel is set against the backdrop of India's independence in 1947 and its subsequent partition.
• It intertwines the protagonist's life with key events in Indian history, offering a fictionalized yet insightful perspective.

Q33. Answer: (b) Cold climate with coniferous forests

The correct answer is Cold climate with coniferous forests.

Key Points

• The Taiga region, also known as the boreal forest, is characterised by its cold climate, with long, harsh winters and short, mild summers.
• Vegetation primarily consists of coniferous trees such as spruce, pine, fir, and larch, which are adapted to survive the freezing temperatures.
• The Taiga is found across the northern hemisphere, including areas of Canada, Russia, Scandinavia, and Alaska.
• Soil in the Taiga is generally acidic and nutrient-poor due to slow decomposition rates in the cold climate.
• It is considered the largest land biome in the world, covering approximately 17% of Earth's land area.

Additional Information

• Climate Adaptations:
• Coniferous trees have needle-like leaves with a waxy coating to prevent water loss during freezing temperatures.
• Snow accumulation on tree branches is reduced due to their conical shape, preventing branch breakage.
• Fauna:
• The Taiga is home to animals such as moose, lynxes, wolves, bears, and migratory birds.
• Many species have adapted to the cold by growing thick fur or migrating to warmer areas during winter.
• Environmental Importance:
• The Taiga plays a crucial role in regulating the global carbon cycle as it stores vast amounts of carbon in its trees and soil.
• It acts as an important oxygen source and contributes significantly to Earth's biodiversity.
• Threats:
• Deforestation and logging are major threats, leading to habitat destruction and loss of biodiversity.
• Climate change impacts such as rising temperatures are causing shifts in vegetation and animal habitats.

Q34. Answer: (d) Amaravati

The correct answer is Amaravati.

Key Points

• The "Quantum Valley Tech Park" initiative was announced in partnership with IBM and TCS to boost quantum computing research and technological innovation in India.
• The park will be established in Amaravati, the capital city of Andhra Pradesh, known for its development focus and infrastructure projects.
• Quantum computing is a transformative technology that utilizes quantum mechanics to solve complex computational problems faster than classical computers.
• This collaboration aims to position India as a global hub for quantum computing and advanced technologies, attracting talent and investments in the field.
• The establishment of this tech park aligns with India's vision of fostering innovation and advancing technological frontiers in areas like artificial intelligence, cryptography, and data analytics.

Additional Information

• Quantum Computing Basics:
• Quantum computing relies on quantum bits or qubits, which can represent both 0 and 1 simultaneously due to superposition.
• Entanglement is another key property, enabling qubits to be interconnected and share information instantaneously.
• Quantum computing applications include cryptography, optimization problems, drug development, and AI advancements.
• Amaravati as a Technological Hub:
• Amaravati is being developed as a smart city with an emphasis on sustainability and technology-driven infrastructure.
• It is positioned to attract investments in IT, biotechnology, and advanced research domains.
• IBM's Role in Quantum Research:
• IBM has been a global leader in quantum computing, offering platforms like IBM Quantum Experience for research and development.

• It collaborates with academia and industries to advance quantum technologies and train skilled professionals.

• TCS Contribution to Technology:

• TCS is one of India's leading IT services companies, known for its innovation in emerging technologies.

• The partnership with Andhra Pradesh reflects TCS's commitment to fostering technological growth and capability building in India.

Q35. Answer: (a) 2010

The correct answer is 2010.

Key Points

• Terminal 3 (T3) of the Indira Gandhi International Airport (IGIA) in Delhi was inaugurated in July 2010.

• It was designed to cater to the growing passenger traffic and has a capacity to handle up to 40 million passengers annually.

• IGIA T3 is one of the largest airport terminals in the world, covering approximately 5.4 million square feet.

• The terminal was constructed as part of the airport's modernization and expansion project, overseen by the Delhi International Airport Limited (DIAL).

• Terminal 3 includes advanced facilities such as automated baggage handling systems, 78 boarding gates, and extensive shopping and dining areas.

Additional Information

• Indira Gandhi International Airport (IGIA):

• Located in Delhi, IGIA is one of the busiest airports in India and South Asia.

• It is ranked among the top airports globally in terms of passenger traffic and service quality.

• The airport is operated by Delhi International Airport Limited (DIAL), a public-private partnership.

• Terminal Modernization:

• IGIA Terminal 3 was developed as part of an extensive modernization plan to meet international standards.

• The project included collaboration with various architectural and engineering firms.

• Modernization projects aim to improve efficiency, passenger experience, and operational capacity.

• Environmental Features:

• Terminal 3 is a LEED Gold-certified building, showcasing its environmentally sustainable design.

• It incorporates energy-efficient systems and water conservation measures.

• Passenger Facilities:

• The terminal includes facilities such as luxury lounges, dedicated check-in counters, and advanced security systems.

• It also features shopping and dining options catering to domestic and international travelers.

Q36. Answer: (c) Androecium

The correct answer is Androecium.

Key Points

• The androecium is the male reproductive part of a flower and consists of stamens.

• A stamen is composed of two main components: the anther (which produces pollen grains) and the filament (a stalk that holds the anther).

• The androecium plays a critical role in the flower's reproduction process by producing male gametes (pollen grains).

• The pollen grains produced by the anther are transferred to the stigma of the female reproductive organ (gynoecium) during pollination.

• Androecium can exist as a single stamen or multiple stamens depending on the flower's structure and species.

Additional Information

• Gynoecium: It is the female reproductive part of a flower, consisting of one or more carpels. Each carpel includes an ovary, style, and stigma.

• Petals: These are colorful parts of a flower that attract pollinators but do not play a direct role in reproduction.

• Sepals: These are the outermost parts of a flower that protect the budding flower before it blooms.

• Pollination: The process by which pollen from the male part (androecium) is transferred to the female part (gynoecium) of a flower to facilitate fertilization.

• Complete and Incomplete Flowers: Flowers containing all four whorls (sepals, petals, androecium, and gynoecium) are termed complete, while those missing one or more whorls are incomplete.

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Q37. Answer: (b) Karnataka

The correct answer is Karnataka.

Key Points

• Yakshagana is a traditional folk theatre form that originated in Karnataka, India.

• This theatre form combines dance, music, dialogue, costume, and makeup into a unique cultural expression.

• Yakshagana performances are often based on stories from Hindu epics such as the Ramayana, Mahabharata, and the Puranas.

• The art form is primarily performed in districts like Udupi, Dakshina Kannada, Uttara Kannada, Shimoga, and Kasaragod (in Kerala).

• Yakshagana is typically performed overnight, starting in the evening and continuing until dawn, with artists engaging in elaborate storytelling and dramatic enactment.

Additional Information

• Yakshagana Terminology:

• Himmela: Refers to the background musicians, including percussionists and vocalists.

• Mummela: Refers to the actors and dancers performing on stage.

• Chande: A traditional drum used in Yakshagana performances.

• Bhagavata: The lead singer and storyteller who narrates the story and sets the tone for the performance.

• Costumes and Makeup: Yakshagana is known for its elaborate costumes, colorful headgear, and intricate facial makeup that represent various mythological characters.

• Historical Background: Yakshagana is believed to have originated as early as the 10th century, evolving from temple rituals and traditional storytelling practices.

• Contemporary Relevance: Yakshagana remains an important cultural symbol of Karnataka, with performances often organized during festivals and cultural events.

• Training and Preservation: Institutions and academies in Karnataka continue to teach and preserve Yakshagana, ensuring the survival of this ancient art form.

Q38. Answer: (b) Second Schedule

The correct answer is Second Schedule.

Key Points

• The Second Schedule of the Indian Constitution contains provisions related to the salaries, allowances, and privileges of constitutional authorities.

• It covers the President, Vice-President, Governors of states, Speaker and Deputy Speaker of the Lok Sabha, Deputy Chairman of the Rajya Sabha, and Judges of the Supreme Court and High Courts.

• Members of the State Legislature and Comptroller and Auditor-General of India (CAG) are also included under this schedule.

• The salaries and emoluments mentioned in the Second Schedule are subject to periodic revision by the Parliament of India.

• This schedule ensures financial independence for constitutional functionaries, reinforcing their autonomy and impartiality.

Additional Information

• Schedules in the Indian Constitution:

• The Indian Constitution initially had 8 schedules; currently, it has 12 schedules after subsequent amendments.

• Each schedule provides details about specific provisions that supplement the articles of the Constitution.

• Significance of the Second Schedule:

• It safeguards the financial independence of constitutional authorities, enabling them to perform their duties without undue influence.

• The autonomy provided through financial provisions ensures the integrity of public administration and governance.

• Examples of Other Schedules:

• Seventh Schedule: Deals with the division of powers between the Union and States through Union, State, and Concurrent Lists.

• Ninth Schedule: Contains laws that are exempted from judicial review under certain conditions.

• Third Schedule: Prescribes the forms of oaths and affirmations for constitutional officeholders.

• Amendments to the Second Schedule:

• The provisions in the Second Schedule have been amended multiple times to revise the salaries and allowances of constitutional authorities.

• Such amendments ensure that the remuneration of officeholders reflects the changing economic conditions and responsibilities of their roles.

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Q39. Answer: (b) Nagaland

The correct answer is Nagaland.

Key Points

• Article 371A of the Indian Constitution provides special provisions to the state of Nagaland to safeguard its social, cultural, and customary practices.

• According to Article 371A, no Act of Parliament related to religious or social practices of Nagas, Naga customary law and procedure, administration of civil and criminal justice, or ownership and transfer of land and its resources, will apply to Nagaland unless the state assembly decides to adopt it.

• This provision was included in the Constitution to respect the unique traditions and customs of the Naga tribes after Nagaland attained statehood in 1963.

• The state has autonomy in matters related to its internal administration and governance to ensure the preservation of Naga identity and heritage.

• It is a significant constitutional safeguard aimed at protecting the rights of tribal communities in the region.

Additional Information

• Article 371: It contains special provisions for several states in India, including Maharashtra, Gujarat, Nagaland, Assam, Manipur, Andhra Pradesh, Sikkim, Mizoram, and Arunachal Pradesh, to address their unique needs and challenges.

• Nagaland Statehood: Nagaland became the 16th state of India on 1st December 1963, following the acceptance of its demand for statehood under the 13th Constitutional Amendment.

• Inner Line Permit (ILP): Nagaland is one of the states where the ILP system is implemented under the Bengal Eastern Frontier Regulation Act, 1873, to regulate the entry of outsiders and protect indigenous communities.

• Naga Tribal Identity: Nagaland is predominantly inhabited by Naga tribes, and each tribe has its distinct customs, dialects, and traditions, which are safeguarded under Article 371A.

• Autonomy in Land and Resources: Under Article 371A, the ownership and transfer of land and its resources are subject to Naga customary laws, providing autonomy in resource management to the state.

Q40. Answer: (c) 78th World Health Assembly

The correct answer is 78th World Health Assembly.

Key Points

• The 78th World Health Assembly (WHA) was held in May 2025, during which the world's first Pandemic Agreement was formally adopted.

• This agreement aims to strengthen global preparedness and response to future pandemics by enhancing international collaboration and transparency.

• The Pandemic Agreement highlights the importance of equitable access to vaccines, diagnostics, and treatments during health emergencies.

• It emphasizes the need for a strong global health architecture to address public health emergencies and mitigate cross-border health threats.

• The agreement also builds on the lessons learned from the COVID-19 pandemic to avoid similar challenges in the future.

Additional Information

• World Health Assembly (WHA)

• The WHA is the decision-making body of the World Health Organization (WHO), comprising representatives from all 194 member states.

• It meets annually in Geneva, Switzerland, to discuss global health policies and priorities.

• The WHA sets the WHO's policies, approves its budget, and appoints the Director-General.

• Pandemic Preparedness

• The COVID-19 pandemic exposed gaps in global health systems, highlighting the need for better preparedness and response mechanisms.

• Key elements of pandemic preparedness include early detection, rapid response, research, and equitable distribution of medical resources.

• International Health Regulations (IHR)

• The IHR (2005) is a legally binding agreement between 196 countries, including WHO Member States, to build capacities to detect, assess, and respond to public health threats.

• The new Pandemic Agreement is expected to build on the existing IHR framework to ensure a more coordinated global response.

• COVID-19 Lessons

• The COVID-19 pandemic underscored the importance of global solidarity and equitable access to life-saving interventions.

• It also highlighted the need for robust surveillance systems and data-sharing mechanisms to track and respond to outbreaks efficiently.

Q41. Answer: (d) 61

Shortcut Trick

Let the present ages of P and Q be P and Q respectively. Given: 4P − Q = 19 ... (i)

After 5 years, the condition is: 9(P + 5) − 3(Q + 5) = 27

Dividing by 3 gives: 3(P + 5) − (Q + 5) = 9 => 3P − Q = −1 ... (ii)

Subtracting (ii) from (i): (4P − Q) − (3P − Q) = 19 − (−1) => P = 20.

Substituting P = 20 in (i): 4 × 20 − Q = 19 => 80 − 19 = Q => Q = 61.

Therefore The correct answer is 61 years.

Alternate Method

Given:

1) 4 times the present age of P exceeds Q by 19 years.

2) After 5 years, 3 times the age of Q will be 27 less than 9 times the age of P.

Present Age Age of P = P Age of Q = Q 4P − Q = 19 After 5 Years Age of P = P + 5 Age of Q = Q + 5 9(P+5) − 3(Q+5) = 27 + 5 yrs

Calculations:

=> Let the present ages of P and Q be P and Q respectively.

=> According to the first condition:

=> 4P − Q = 19

=> Q = 4P − 19 ---- (Equation 1)

=> According to the second condition (after 5 years):

=> 3(Q + 5) = 9(P + 5) − 27

=> 3Q + 15 = 9P + 45 − 27

=> 3Q + 15 = 9P + 18

=> 3Q − 9P = 3

=> Dividing the entire equation by 3:

=> Q − 3P = 1 ---- (Equation 2)

=> Substitute the value of Q from Equation 1 into Equation 2:

=> (4P − 19) − 3P = 1

=> P − 19 = 1

=> P = 20

=> Substitute the value of P in Equation 1 to find Q:

=> Q = 4(20) − 19

=> Q = 80 − 19

=> Q = 61

Therefore The correct answer is 61 years.

Additional Information

Problems on Ages

If the current age of a person is x, then their age n years ago was (x − n) and their age after n years will be (x + n).

Ratio of Ages

If the ratio of the present ages of A and B is a : b, their ages can be assumed as ax and bx. After n years, their new ages will be (ax + n) and (bx + n).

Linear Equations in Two Variables

Age calculation problems often involve creating a system of linear equations from the given conditions and solving them systematically using substitution or elimination methods to find the unknown variables.

Q42. Answer: (c) $\text{cosec}^2 A \sec^2 A$

Shortcut Trick

Put A = 45° in the given expression.

=> $(1 + \cot^2 45°) + (1 + 1/\cot^2 45°)$

=> (1 + 1) + (1 + 1) = 4

Now check the given options for A = 45°:
Option 3 => $\text{cosec}^2 45° \times \sec^2 45° = (\sqrt{2})^2 \times (\sqrt{2})^2 = 2 \times 2 = 4$
Therefore The correct answer is $\text{cosec}^2 A \sec^2 A$.
Alternate Method
Given:
$(1 + \cot^2 A) + (1 + 1/\cot^2 A)$
Formula Used:
$1 + \cot^2\theta = \text{cosec}^2\theta$
$1 + \tan^2\theta = \sec^2\theta$
$\sin^2\theta + \cos^2\theta = 1$
Calculations:
=> We know that $1 / \cot^2 A = \tan^2 A$
=> The expression becomes: $(1 + \cot^2 A) + (1 + \tan^2 A)$
=> Using identities: $\text{cosec}^2 A + \sec^2 A$
=> Converting into sine and cosine: $(1 / \sin^2 A) + (1 / \cos^2 A)$
=> Taking LCM: $(\cos^2 A + \sin^2 A) / (\sin^2 A \times \cos^2 A)$
=> Applying $\sin^2 A + \cos^2 A = 1$: $1 / (\sin^2 A \times \cos^2 A)$
=> Separating the terms: $(1 / \sin^2 A) \times (1 / \cos^2 A)$
=> Converting back: $\text{cosec}^2 A \times \sec^2 A$
Therefore The correct answer is $\text{cosec}^2 A \sec^2 A$.
Additional Information
Pythagorean Trigonometric Identities
$\sin^2\theta + \cos^2\theta = 1$ | $1 + \tan^2\theta = \sec^2\theta$ | $1 + \cot^2\theta = \text{cosec}^2\theta$
Reciprocal Identities
$\sin\theta = 1 / \text{cosec}\theta$ | $\cos\theta = 1 / \sec\theta$ | $\tan\theta = 1 / \cot\theta$
Special Trigonometric Relation
$\sec^2\theta + \text{cosec}^2\theta = \sec^2\theta \times \text{cosec}^2\theta$. The sum of these two specific squares is identically equal to their product.

Q43. Answer: (d) Rs. 1,916

Shortcut Trick
Since the time period is the same, the profit ratio is equal to the investment ratio.
Total ratio parts = 59 + 14 + 72 = 145 parts.
Difference in ratio parts of Q and R = 72 − 14 = 58 parts.
Difference amount = (58 ÷ 145) × 4790
=> (2 ÷ 5) × 4790 = 2 × 958 = 1916
Therefore The correct answer is Rs. 1,916.
Alternate Method
Given:
Investment ratio of P, Q, and R = 59 : 14 : 72
Total profit earned at the end of the year = Rs. 4,790
Formula Used:
Profit Share = (Individual Ratio Part ÷ Total Ratio Parts) × Total Profit
Profit Distribution Ratio
P: 59 parts
Q: 14
R: 72 parts
Difference (R − Q) = 58 parts
Calculations:
=> Total sum of ratios = 59 + 14 + 72 = 145 parts
=> The total profit corresponds to 145 parts = Rs. 4,790
=> Value of 1 part = 4790 ÷ 145
=> Difference in parts of Q and R = 72 − 14 = 58 parts

=> Difference in amount = 58 × (4790 ÷ 145)

=> We can simplify the fraction (58 ÷ 145) by dividing the numerator and denominator by their common factor 29.

=> (29 × 2 = 58) and (29 × 5 = 145)

=> Simplified multiplier = 2 ÷ 5

=> Difference in amount = (2 ÷ 5) × 4790

=> Difference in amount = 2 × 958 = Rs. 1,916

Therefore The correct answer is Rs. 1,916.

Additional Information

Partnership Profit Ratio

When the time period of investment is the same for all partners, the profit is distributed in the exact ratio of their capital investments. Profit Ratio = C1 : C2 : C3.

Different Time Periods

When time periods vary, the profit is distributed in the ratio of the product of capital and time. Profit Ratio = (C1 × T1) : (C2 × T2).

Active and Sleeping Partners

An active partner may receive an additional fixed salary or percentage of total profit for managing the business. The remaining profit is then distributed among all partners based on their investment ratio.

Q44. Answer: (c) 8.24

Shortcut Trick

√121 = 11

√0.0196 = 0.14 (Since $14^2 = 196$ and root of 4 decimal places gives 2 decimal places)

√8.41 = 2.9 (Since $29^2 = 841$ and root of 2 decimal places gives 1 decimal place)

=> 11 + 0.14 − 2.9 = 8.24

Therefore The correct answer is 8.24.

Alternate Method

Given:

Expression: √121 + √0.0196 − √8.41

Calculation:

=> √121 = 11

=> √0.0196 = √(196 ÷ 10000)

=> √(196 ÷ 10000) = 14 ÷ 100 = 0.14

=> √8.41 = √(841 ÷ 100)

=> √(841 ÷ 100) = 29 ÷ 10 = 2.9

Substitute these values into the given expression:

=> 11 + 0.14 − 2.9

=> 11.14 − 2.90

=> 8.24

Therefore The correct answer is 8.24.

Additional Information

Square Roots of Decimals

When taking the square root of a decimal number, the perfect square must have an even number of decimal places. The resulting square root will have exactly half as many decimal places.

BODMAS Rule

This rule dictates the exact order of mathematical operations: Brackets, Orders (including square roots and exponents), Division × Multiplication, and Addition − Subtraction.

Common Perfect Squares

Memorizing perfect squares such as $14^2 = 196$ and $29^2 = 841$ helps in solving root-based simplification questions accurately and rapidly without manual division.

Q45. Answer: (c) 36 cm

Shortcut Trick

Direct formula for the perimeter of a semicircle: P = r × (π + 2)

Using π = 22/7, the multiplying factor (π + 2) always becomes 36/7.

P = 7 × (36/7)
P = 36 cm
Therefore The correct answer is 36 cm.
Alternate Method
Given:
Radius of the semicircle (r) = 7 cm
Formula Used:
Perimeter of a semicircle = Arc Length + Diameter
Perimeter = πr + 2r
r = 7 cm
Diameter = 2r = 14 cm
Arc Length = πr
Calculations:
=> Arc length = 22/7 × 7
=> Arc length = 22 cm
=> Diameter = 2 × 7
=> Diameter = 14 cm
=> Total Perimeter = Arc length + Diameter
=> Total Perimeter = 22 + 14 = 36 cm
Therefore The correct answer is 36 cm.
Additional Information
Area of Semicircle
The area of a semicircle is exactly half of the area of a full circle. Formula: Area = 1/2 × πr²
Perimeter of a Quarter Circle
A quarter circle's perimeter is made up of a curved arc and two separate radii enclosing it. Formula: Perimeter = πr/2 + 2r
Area of a Quarter Circle
The area is exactly one-fourth of the area of a full circle. Formula: Area = 1/4 × πr²

Q46. Answer: (c) 45/2

Shortcut Trick
Total work = LCM(30, 10, 9) = 90 units.
Efficiency of Anjani = 90 ÷ 30 = 3 units/day.
Efficiency of (Anjani + Khushbu + Sushmita) = 90 ÷ 9 = 10 units/day.
Efficiency of (Anjani + Khushbu) = 90 ÷ 10 = 9 units/day.
Efficiency of Sushmita = 10 − 9 = 1 unit/day.
Time for Anjani + Sushmita = 90 ÷ (3 + 1) = 90 ÷ 4 = 45/2 days.
Therefore The correct answer is 45/2 days.
Alternate Method
Given:
Time taken by Anjani (A) = 30 days
Time taken by Anjani and Khushbu (A + K) = 10 days
Time taken by Anjani, Khushbu and Sushmita (A + K + S) = 9 days
Total Work is taken as the LCM of all given days: LCM(30, 10, 9) = 90 units.

Person	Days	Total Work	Efficiency
Anjani (A)	30	90	90 ÷ 30 = 3
A + K	10	90 ÷ 10 = 9	
A + K + S	9	90 ÷ 9 = 10	

Calculations:
=> Efficiency of S = Efficiency of (A + K + S) − Efficiency of (A + K)
=> Efficiency of S = 10 − 9 = 1 unit/day

=> Combined efficiency of A and S = Efficiency of A + Efficiency of S

=> Combined efficiency of A and S = 3 + 1 = 4 units/day

=> Time taken by A and S = Total Work ÷ Combined Efficiency

=> Time taken = 90 ÷ 4 = 45/2 days

Therefore The correct answer is 45/2 days.

Additional Information

Pipes & Cisterns

Works on the same logic as Time & Work. Inlet pipes have positive efficiency, and outlet (emptying) pipes have negative efficiency.

Work and Wages

Wages are distributed in direct proportion to the actual amount of work done. If people work for the same number of days, wages are proportional to their efficiencies.

Alternate Day Work

When individuals work on alternate days, calculate the work done in one complete cycle (e.g., 2 days for 2 people) and divide total work by cycle work to find the number of cycles.

MDH Formula

For groups of people doing work: (M1 × D1 × H1) ÷ W1 = (M2 × D2 × H2) ÷ W2.

Q47. Answer: (c) 1

Shortcut Trick

In the range 488 to 494, we can immediately ignore all even numbers.

We only need to check the odd numbers: 489, 491, and 493.

489 is divisible by 3 (sum of digits is 21) and 493 is divisible by 17 (17 × 29 = 493).

491 is not divisible by any prime number up to √491 ≈ 22, hence it is a prime number.

Thus, there is only 1 prime number in the given range.

Therefore The correct answer is 1.

Alternate Method

Given:

Range of numbers: 488 to 494 (both included).

Concept Used:

A prime number has only two distinct factors: 1 and itself.

To check if a number N is prime, we divide it by all prime numbers less than or equal to √N.

Calculations:

=> The given numbers are 488, 489, 490, 491, 492, 493, 494.

=> Even numbers (488, 490, 492, 494) are divisible by 2, so they are not prime.

=> Now, check the remaining odd numbers: 489, 491, 493.

=> 489: Sum of digits = 4 + 8 + 9 = 21. Since 21 is divisible by 3, 489 is not prime.

=> 493: We check prime factors up to √493 ≈ 22 (Primes: 2, 3, 5, 7, 11, 13, 17, 19).

=> 493 ÷ 17 = 29. Since it is perfectly divisible by 17, 493 is not prime.

=> 491: We check prime factors up to √491 ≈ 22.

=> 491 is not divisible by 2, 3, 5, 7, 11, 13, 17, or 19.

=> Thus, 491 is a prime number.

=> There is exactly 1 prime number lying between 488 and 494.

Therefore The correct answer is 1.

Additional Information

Prime Numbers

A natural number greater than 1 that has exactly two distinct positive divisors: 1 and itself (e.g., 2, 3, 5, 7, 11).

Co-prime Numbers

Two numbers are co-prime (or mutually prime) if their highest common factor (HCF) is exactly 1. They do not need to be prime numbers themselves.

Primality Test

To systematically check if a number N is prime, find the largest integer less than or equal to √N and check for divisibility by all prime numbers up to that integer.

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Q48. Answer: (d) 2916π cm²

Shortcut Trick

Surface area of a sphere = 4πr²

Given diameter = 54 cm, so radius = 27 cm.

Area = 4 × π × 27² = 4 × 729 × π

Unit digit trick: The units digit of 4 × 9 is 6.

Among the given options, only 2916π ends in 6.

Therefore The correct answer is 2916π cm².

Alternate Method

Given:

Diameter of the sphere (d) = 54 cm

Formula Used:

Surface area of a sphere = 4πr²

Radius (r) = d ÷ 2

r = 27 cm

Diameter = 54 cm

Calculations:

=> Radius (r) = 54 ÷ 2 = 27 cm

=> Surface Area = 4 × π × (27)²

=> Surface Area = 4 × π × 729

=> Surface Area = 2916π cm²

Therefore The correct answer is 2916π cm².

Additional Information

Volume of a Sphere

The total 3D space occupied by a sphere is given by the formula V = (4÷3)πr³.

Surface Area of a Hemisphere

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

Volume of a Hemisphere

Exactly half the volume of a complete sphere, calculated as V = (2÷3)πr³.

Q49. Answer: (b) increase by Rs. 2,268

Shortcut Trick

Since Income = Expenditure + Savings, the overall increase in Income must equal the sum of increases in Expenditure and Savings.

Total increase in Income = 22% of Rs. 86,400 = Rs. 19,008.

Original Expenditure = (100% − 22.5%) = 77.5% of Rs. 86,400 = (31 ÷ 40) × 86400 = Rs. 66,960.

Total increase in Expenditure = 25% of Rs. 66,960 = (1 ÷ 4) × 66960 = Rs. 16,740.

Increase in Savings = Rs. 19,008 − Rs. 16,740 = Rs. 2,268.

Therefore The correct answer is Rs. 2,268.

Alternate Method

Given:

Initial Income = Rs. 86,400

Savings percentage = 22.5%

Increase in Income = 22%

Increase in Expenditure = 25%

Exp = 77.5%

Sav = 22.5%

Original Income (100%) = Rs. 86,400

New Exp = 96.875%

Sav = 25.125%

New Income (122%)

Net change in Savings = 25.125% − 22.5% = + 2.625%

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Calculations:

=> Let the original income be 100%.

=> Original Savings = 22.5%

=> Original Expenditure = 100% − 22.5% = 77.5%

=> New Income = 100% + 22% = 122%

=> New Expenditure = 77.5% + (25% of 77.5%) = 77.5% × 1.25 = 96.875%

=> New Savings = New Income − New Expenditure

=> New Savings = 122% − 96.875% = 25.125%

=> Net change in Savings = 25.125% − 22.5% = 2.625% (Increase)

=> Actual increase in Savings = 2.625% of Rs. 86,400

=> Actual increase = (2.625 ÷ 100) × 86400 = 2.625 × 864 = Rs. 2,268

Therefore The correct answer is Rs. 2,268.

Additional Information

Income-Expenditure Equation

Income always equals the sum of Expenditure and Savings. Any percentage change in income is distributed among expenditure and savings based on their weighted initial values.

Alligation in Income-Expenditure

The percentage change in income is the weighted average of the percentage change in expenditure and percentage change in savings. Formula: Change in Income = (Expenditure ÷ Income) × % Change in Exp + (Savings ÷ Income) × % Change in Sav.

Successive Percentage Change

When a base value undergoes multiple changes independently, tracking changes on a constant base of 100% makes fraction simplification and final difference calculations much faster.

Q50. Answer: (d) 34 km/hr

Shortcut Trick

Total distance = 811 km, Total time = 14 hr.

Distance covered in first 5 hr = 91 × 5 = 455 km.

Time taken for next 84 km at 84 km/hr = 1 hr.

Remaining distance = 811 − (455 + 84) = 272 km.

Remaining time = 14 − (5 + 1) = 8 hr.

Required speed = 272 ÷ 8 = 34 km/hr.

Therefore The correct answer is 34 km/hr.

Alternate Method

Given:

Total distance = 811 km

Total decided time = 14 hours

Speed for the first 5 hours = 91 km/hr

Speed for the next 84 km = 84 km/hr

Formula Used:

Distance = Speed × Time

Time = Distance ÷ Speed

Speed = Distance ÷ Time

Total: 811 km in 14 hours

91 km/hr

84 km/hr

? km/hr

D = 455 km

T = 5 hr

D = 84 km

T = 1 hr

D = 272 km

T = 8 hr

Part 1
Part 2
Remaining
Calculations:
=> Distance covered in first 5 hours = 91 × 5 = 455 km
=> Time taken to cover next 84 km = 84 ÷ 84 = 1 hour
=> Total distance covered so far = 455 + 84 = 539 km
=> Total time taken so far = 5 + 1 = 6 hours
=> Remaining distance = 811 − 539 = 272 km
=> Remaining time available = 14 − 6 = 8 hours
=> Required speed for the remaining journey = 272 ÷ 8 = 34 km/hr
Therefore The correct answer is 34 km/hr.
Additional Information
Average Speed
Average speed is the total distance traveled divided by the total time taken. Average Speed = Total Distance ÷ Total Time.
Relative Speed
When two objects move in the same direction, relative speed = |S1 − S2|. When moving in opposite directions, relative speed = S1 + S2.
Unit Conversion
To convert speed from km/hr to m/s, multiply the value by 5/18. To convert m/s to km/hr, multiply by 18/5.

Q51. Answer: (c) 50

Shortcut Trick
Total days = 24 (Feb) + 31 (Mar) + 6 (Apr) = 61 days.
Since 2024 is a leap year (366 days), time in years = 61 ÷ 366 = 1/6 year.
Simple Interest = (P × R × T) ÷ 100
SI = (4000 × 7.5 × 1/6) ÷ 100 = 50
Therefore The correct answer is Rs. 50.
Alternate Method
Given:
Principal (P) = Rs. 4000
Rate of Interest (R) = 7.5% per annum
Date of deposit = 5 February 2024
Date of withdrawal = 6 April 2024
Formula Used:
Simple Interest (SI) = (P × R × T) ÷ 100
5 Feb 2024
6 Apr 2024
P = Rs. 4000
A = Rs. 4050
Time = 61 Days
Rate = 7.5% p.a.
SI = Rs. 50
Calculations:
=> Number of days in February (2024 is a leap year) = 29 − 5 = 24 days
=> Number of days in March = 31 days
=> Number of days in April = 6 days
=> Total duration = 24 + 31 + 6 = 61 days
=> Since 2024 has 366 days, Time (T) in years = 61 ÷ 366 = 1/6 year
=> SI = (4000 × 7.5 × 1) ÷ (100 × 6)
=> SI = 30000 ÷ 600
=> SI = 50

Therefore The correct answer is Rs. 50.

Additional Information

Counting Days for Interest

When calculating interest between two specific dates, generally only one of the boundary dates (either the deposit date or the withdrawal date) is counted, but never both.

Leap Year Calculation

A year perfectly divisible by 4 is a leap year containing 366 days. Always use 366 as the denominator when formulating the time portion in years if the calculated days include the 29th of February.

Simple Interest vs Compound Interest

In Simple Interest, the principal balance does not change throughout the entire lending period. Under Compound Interest, accumulated interest is added periodically back to the principal, forming a new base for subsequent calculations.

Q52. Answer: (c) 2250

Shortcut Trick

Let the original number be 100%.

After a 60% increase, the new value becomes 100% + 60% = 160%.

Given that 160% of the number = 3600

1% of the number = 3600 ÷ 160 = 22.5

100% of the number = 22.5 × 100 = 2250

Therefore The correct answer is 2250.

Alternate Method

Given:

A number, when increased by 60%, gives 3600.

Original Number (100%)

• 60% Increase

Total: 160% = 3600

Formula Used:

New Value = Original Value × (100 + Increase%) ÷ 100

Calculation:

Let the original number be x.

=> x + (60% of x) = 3600

=> x + (60 ÷ 100) × x = 3600

=> x + 0.6x = 3600

=> 1.6x = 3600

=> x = 3600 ÷ 1.6

=> x = 36000 ÷ 16

=> x = 2250

Therefore The correct answer is 2250.

Additional Information

Percentage Increase

When a value is increased by R%, the new value becomes (100 + R)% of the original value. The multiplying factor is (1 + R/100).

Percentage Decrease

When a value is decreased by R%, the new value becomes (100 − R)% of the original value. The multiplying factor is (1 − R/100).

Successive Percentage Change

If a number is successively changed by a% and b%, the net percentage change is given by the formula: a + b + (a × b) ÷ 100.

Q53. Answer: (a) 166

Shortcut Trick

The average of the first n even numbers is directly given by the formula (n + 1).

Here, the number of terms n = 165.

Average = 165 + 1 = 166.

Therefore The correct answer is 166.

Alternate Method

Given:
Number of even terms (n) = 165
Formula Used:
Average of an Arithmetic Progression = (First term + Last term) ÷ 2
Last term of the first n even numbers = 2n
First term
2
Last term
330
Average = (2 + 330) ÷ 2
166
Result: Average = 166
Calculations:
=> First even number (a) = 2
=> 165th even number (l) = 165 × 2 = 330
=> Average = (2 + 330) ÷ 2
=> Average = 332 ÷ 2
=> Average = 166
Therefore The correct answer is 166.
Additional Information
Average of First n Odd Numbers
The average of the first n odd numbers is always equal to n.
Average of First n Natural Numbers
The average of the first n natural numbers is given by the formula (n + 1) ÷ 2.
Sum of First n Even Numbers
The sum of the first n even numbers is calculated as n(n + 1).

Q54. Answer: (b) Rs. 550.80

Shortcut Trick
10% discount => MP : SP = 10 : 9
15% discount => MP : SP = 20 : 17
Combined MP : SP = (10 × 20) : (9 × 17) = 200 : 153
Given 200 units = Rs. 720 => 1 unit = Rs. 3.60
Selling Price = 153 units = 153 × 3.60 = Rs. 550.80
Therefore The correct answer is Rs. 550.80.
Alternate Method
Given:
Marked Price (MP) = Rs. 720
First Discount (D1) = 10%
Second Discount (D2) = 15%
Formula Used:
Selling Price (SP) = MP × (100 − D1)/100 × (100 − D2)/100
MP
Rs. 720
SP 1
Rs. 648
Final SP
Rs. 550.80
−10%
−15%
Calculations:
=> SP = 720 × (100 − 10)/100 × (100 − 15)/100

=> SP = 720 × 90/100 × 85/100

=> SP = 720 × 9/10 × 17/20

=> SP = 720 × 153/200

=> SP = 3.6 × 153

=> SP = 550.80

Therefore The correct answer is Rs. 550.80.

Additional Information

Equivalent Single Discount

Two successive discounts of a% and b% are mathematically equivalent to a single effective discount of (a + b − ab/100)%.

Marked Price vs Cost Price

Marked price is established above the cost price to offer customer discounts while safely maintaining a fixed profit margin. MP = CP × (100 + Markup %)/100.

Successive Price Changes

When multiple successive percentage changes occur across periods or transactions, the final value is found as Final = Initial × (1 − D1/100) × (1 − D2/100).

Q55. Answer: (b) Rs. 2,000

Shortcut Trick

Let the Principal sum be 100%.

Total Simple Interest for 4 years = 5% × 4 = 20%

Amount = Principal + SI = 100% + 20% = 120%

Given Amount = Rs. 2,400

=> 120% = 2,400 => 100% = (2,400 ÷ 120) × 100 = 2,000

Therefore The correct answer is Rs. 2,000.

Alternate Method

Given:

Amount (A) = Rs. 2,400

Rate of Interest (R) = 5% per annum

Time (T) = 4 years

Formula Used:

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

Amount (A) = P + SI = P[1 + (R × T) ÷ 100]

Year 0

Principal (P)

Year 4

Amount = Rs. 2,400

SI = 20% of P

Total Amount = 120% of P

Calculation:

=> Let the Principal be P.

=> Simple Interest (SI) = (P × 5 × 4) ÷ 100

=> SI = 20P ÷ 100 = 0.2P

=> Amount = P + 0.2P = 1.2P

=> Given Amount = Rs. 2,400

=> 1.2P = 2,400

=> P = 2,400 ÷ 1.2 = 2,000

Therefore The correct answer is Rs. 2,000.

Additional Information

Compound Interest Formula

Compound Interest calculates interest on both the initial principal and the accumulated interest. A = P(1 + R ÷ 100)^T.

Difference Between CI and SI

For 2 years, the difference between Compound Interest and Simple Interest on a given principal P at rate R is calculated by:

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Difference = $P(R \div 100)^2$.

Rule of 72

A quick way to estimate the number of years required to double your investment at a given annual fixed rate of interest. Years ≈ 72 ÷ R.

Q56. Answer: (a) 9,603

Shortcut Trick

The average of the given ratio 3 : 5 : 7 is (3 + 5 + 7) ÷ 3 = 5 units.

Since the average price is given directly as Rs. 16,005, we can equate:

5 units = Rs. 16,005

1 unit = 16,005 ÷ 5 = Rs. 3,201

The cheapest item corresponds to 3 units = 3 × 3,201 = Rs. 9,603.

Therefore The correct answer is Rs. 9,603.

Alternate Method

Total Price = 15 units

3u

Cheapest

5u

7u

Average = 15u ÷ 3 = 5u = Rs. 16,005

Given:

=> Average price of 3 items = Rs. 16,005

=> Ratio of prices = 3 : 5 : 7

Calculations:

=> Total price of 3 items = 16,005 × 3 = Rs. 48,015

=> Let the individual prices of the items be 3x, 5x, and 7x respectively.

=> Sum of all items = 3x + 5x + 7x = 15x

=> 15x = 48,015

=> x = 48,015 ÷ 15

=> x = 3,201

=> The cheapest item corresponds to the smallest ratio, which is 3x.

=> Price of cheapest item = 3 × 3,201 = Rs. 9,603

Therefore The correct answer is Rs. 9,603.

Additional Information

Average Basic Formula

Average = Sum of all observations ÷ Total number of observations.

Ratio Multiplier Rule

If quantities are given in the ratio a : b : c, their exact numeric values can be expressed as ax, bx, and cx where x represents the common multiplier.

Combined Average

For two distinct groups possessing averages A1 and A2 with sample sizes n1 and n2, the Combined Average is calculated as (n1A1 + n2A2) ÷ (n1 + n2).

Q57. Answer: (b) 260

Shortcut Trick

Cost price of 12 pens (1 dozen) = Rs. 150

Selling price of 12 pens = 12 × 45 = Rs. 540

Total profit = 540 − 150 = Rs. 390

Profit % = (390 ÷ 150) × 100 = 260%

Therefore The correct answer is 260%.

Alternate Method

Given:

Cost price of 12 pens = Rs. 150

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Selling price of 1 pen = Rs. 45
Formula Used:
Profit = Selling Price (SP) − Cost Price (CP)
Profit % = (Profit ÷ CP) × 100
CP of 1 dozen
Rs. 150
SP of 1 dozen
Rs. 540
Profit = Rs. 390
Profit % = (390 ÷ 150) × 100 = 260%
Calculations:
=> Cost price of 1 pen = 150 ÷ 12 = Rs. 12.5
=> Profit earned on 1 pen = SP − CP
=> Profit = 45 − 12.5 = Rs. 32.5
=> Profit % = (Profit ÷ CP) × 100
=> Profit % = (32.5 ÷ 12.5) × 100
=> Profit % = (325 ÷ 125) × 100
=> Profit % = 2.6 × 100 = 260%
Therefore The correct answer is 260%.
Additional Information
Marked Price and Discount
Discount is always calculated on the Marked Price (MP). Formula: Selling Price = MP − Discount.
Dishonest Dealer
When a dealer sells goods at cost price but uses a false weight, Profit % = (Error ÷ True Weight − Error) × 100.
Successive Discounts
For two successive discounts of a% and b%, the equivalent single discount is given by: (a + b − ab ÷ 100)%.

Q58. Answer: (a) 83^(-19)

Shortcut Trick
Using the laws of exponents directly from left to right:
a^m ÷ aⁿ × a^p = a^(m − n + p)
=> 83^(−2) ÷ 83^7 × 83^(−10)
=> 83^(−2 − 7 + (−10))
=> 83^(−19)
Therefore The correct answer is 83^(−19).
Alternate Method
Given:
Expression: 83^(−2) ÷ 83^7 × 83^(−10)
Formula Used:
Law of Division: a^m ÷ aⁿ = a^(m − n)
Law of Multiplication: a^m × aⁿ = a^(m + n)
Calculations:
According to the BODMAS rule, perform division and multiplication from left to right:
=> 83^(−2) ÷ 83^7 = 83^(−2 − 7)
=> 83^(−9)
Now, multiply the result with the remaining term:
=> 83^(−9) × 83^(−10)
=> 83^(−9 + (−10))
=> 83^(−19)
Therefore The correct answer is 83^(−19).
Additional Information
Law of Exponents (Multiplication)

When multiplying expressions with the same base, you add the exponents: $a^m \times a^n = a^{(m + n)}$.

Law of Exponents (Division)

When dividing expressions with the same base, you subtract the exponents: $a^m \div a^n = a^{(m - n)}$.

Negative Exponent Rule

A negative exponent indicates the reciprocal of the base raised to a positive power: $a^{(-n)} = 1 \div a^n$.

Q59. Answer: (d) 31

Shortcut Trick

The product of two consecutive positive natural numbers is slightly greater than the square of the smaller number.

We know that $30^2 = 900$, so the smaller number should be close to 30.

Let's check the product of 30 and the next natural number: $30 \times 31 = 930$.

The numbers are 30 and 31, and the greater number among them is 31.

Therefore The correct answer is 31.

Alternate Method

Given:

The product of two consecutive positive natural numbers is 930.

Formula Used:

Quadratic equation formulation: $x(x + 1) = \text{Product}$

Calculations:

=> Let the smaller positive natural number be x.

=> The next consecutive positive natural number is $(x + 1)$.

=> Product of the numbers = $x \times (x + 1) = 930$

=> $x^2 + x - 930 = 0$

=> To solve this quadratic equation, we split the middle term.

=> $x^2 + 31x - 30x - 930 = 0$

=> $x(x + 31) - 30(x + 31) = 0$

=> $(x - 30)(x + 31) = 0$

=> Since x must be a positive natural number, $x = 30$.

=> The smaller number is 30.

=> The greater number is $x + 1 = 30 + 1 = 31$.

Therefore The correct answer is 31.

Additional Information

Consecutive Numbers

Consecutive numbers are numbers that follow each other in order from smallest to largest without gaps, defined mathematically as n, n+1, n+2, etc.

Estimation using Perfect Squares

The product of consecutive numbers $n(n+1)$ is approximately n^2. By finding the square root of the product, you can quickly estimate the numbers.

Quadratic Equations

The roots of any standard quadratic equation $ax^2 + bx + c = 0$ can be found by factorization, completing the square, or by applying the quadratic formula.

Q60. Answer: (c) $12x^2 - 2x - 2$

Shortcut Trick

Expand the brackets mentally and collect like terms in one go.

x^2 terms: $7x^2 + 5x^2 = 12x^2$

x terms: $-2x$

Constant terms: $-15 + 13 = -2$

Combining all together gives $12x^2 - 2x - 2$.

Therefore The correct answer is $12x^2 - 2x - 2$.

Alternate Method

Given:

Expression: $x(7x - 2) + 5(x^2 - 3) + 13$

Calculation:

=> First, expand the terms inside the brackets using the distributive property.

=> $x(7x - 2) = 7x^2 - 2x$

=> $5(x^2 - 3) = 5x^2 - 15$

=> Now, substitute these back into the original expression.

=> $7x^2 - 2x + 5x^2 - 15 + 13$

=> Group the like terms together.

=> $(7x^2 + 5x^2) - 2x + (-15 + 13)$

=> $12x^2 - 2x - 2$

Therefore The correct answer is $12x^2 - 2x - 2$.

Additional Information

Distributive Property

It states that multiplying a sum by a number gives the same result as multiplying each addend by the number and then adding the products. Formula: a(b + c) = ab + ac.

Like Terms in Algebra

Terms whose variables and their exponents are exactly the same. Only like terms can be combined using addition or subtraction.

BODMAS Rule

Order of operations in simplification: Brackets, Orders (powers/roots), Division, Multiplication, Addition, and Subtraction.

Q61. Answer: (a) 2 hours

Shortcut Trick

When the distance traveled is constant, speed is inversely proportional to the time taken.

Ratio of speeds (Arjun : Malaika) = 66 : 99 = 2 : 3

Therefore Ratio of time taken (Arjun : Malaika) = 3 : 2

Arjun's time = 3 units → 3 hours.

Malaika's time = 2 units → 2 hours.

Therefore The correct answer is 2 hours.

Alternate Method

Given:

Arjun's speed = 66 km/hr

Arjun's time = 3 hours

Malaika's speed = 99 km/hr

Formula Used:

Distance = Speed × Time

Time = Distance ÷ Speed

Delhi

Kanpur

Distance = 198 km

Arjun: Speed = 66 km/hr | Time = 3 hrs

Malaika: Speed = 99 km/hr | Time = ?

Calculations:

=> Total distance between Delhi and Kanpur = Arjun's speed × Arjun's time

=> Distance = 66 × 3 = 198 km

=> Time taken by Malaika = Total distance ÷ Malaika's speed

=> Time taken by Malaika = 198 ÷ 99 = 2 hours

Therefore The correct answer is 2 hours.

Additional Information

Speed & Distance Relationship

When distance is constant, speed is inversely proportional to time: S1 × T1 = S2 × T2.

Average Speed

If two equal distances are covered at speeds a and b, the average speed over the entire journey is (2ab) ÷ (a + b).

Relative Speed

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When two bodies move in opposite directions, their relative speed = S1 + S2. When moving in the same direction, relative speed = |S1 − S2|.

Q62. Answer: (d) Rs. 336

Shortcut Trick

For successive discounts of x% and y%, the difference between a flat (x + y)% discount and the successive discounts is directly given by (x × y) ÷ 100 %.

Given successive discounts: 7% and 10%.

Difference in discount % = (7 × 10) ÷ 100 = 0.7%

Difference in Final Price = 0.7% of Rs. 48,000

Difference = (0.7 ÷ 100) × 48000 = Rs. 336

Therefore The correct answer is Rs. 336.

Alternate Method

Given:

Marked Price (MP) of the TV = Rs. 48,000

First case: Successive discounts of d1 = 7% and d2 = 10%

Second case: Flat discount of D = 17%

Formula Used:

Effective successive discount % = x + y − (x × y) ÷ 100

Rs. 48,000

Flat 17% Discount = Rs. 8,160

7% & 10% Discount = Rs. 7,824

Diff = Rs. 336

Calculations:

=> Effective successive discount = 7 + 10 − (7 × 10) ÷ 100

=> Effective successive discount = 17 − 0.7 = 16.3%

=> Difference between flat discount and successive discount = 17% − 16.3% = 0.7%

=> Difference in final price = Difference in actual discount amount

=> Difference = 0.7% of Rs. 48,000

=> Difference = (0.7 ÷ 100) × 48000 = 0.7 × 480 = 336

Therefore The correct answer is Rs. 336.

Additional Information

Effective Successive Discount

When two successive discounts of x% and y% are applied on an item, the overall effective discount is calculated using the formula: Effective Discount = x + y − (x × y) ÷ 100.

Flat vs Successive Discount

For the same numerical sum of percentage discounts, a single flat discount will always be greater than applying them successively. The percentage difference exactly equals the interaction term (x × y) ÷ 100.

Selling Price Formula

The selling price after a discount is evaluated as SP = MP × (100 − D) ÷ 100, where MP is the Marked Price and D is the final effective discount percentage.

Q63. Answer: (b) 50°

Shortcut Trick

By the Exterior Angle Theorem in triangle AEC, the exterior angle at vertex E equals the sum of its two remote interior angles.

=> angle C = 90° − 60° = 30° (calculated from right triangle BDC)

=> angle AEB = angle CAE + angle C

=> angle AEB = 20° + 30° = 50°

Therefore The correct answer is 50°.

Alternate Method

Given:

In triangle ABC, BD perpendicular to AC at D.

angle DBC = 60° and angle CAE = 20°.

E is a point on the line segment BC.

60°

20°

30°

?

A

B

C

D

E

Formula Used:

Exterior Angle of a triangle = Sum of remote opposite interior angles.

Calculations:

In right-angled triangle BDC, angle BDC = 90° (since BD perpendicular to AC).

=> angle C = 180° − (90° + 60°)

=> angle C = 30°

In triangle AEC, the line BC extends forming an exterior angle at vertex E.

According to the Exterior Angle Theorem:

=> angle AEB = angle CAE + angle C

=> angle AEB = 20° + 30°

=> angle AEB = 50°

Therefore The correct answer is 50°.

Additional Information

Exterior Angle Theorem

The measure of an exterior angle of a triangle is exactly equal to the sum of the measures of its two remote (non-adjacent) interior angles.

Angle Sum Property

The sum of all interior angles inside any triangle is always 180°.

Right-Angled Triangle Property

In a triangle where one angle is strictly 90°, the remaining two acute angles are complimentary (their sum equals 90°).

Q64. Answer: (d) 14

Shortcut Trick

Number to be added = Divisor − Remainder

Remainder when 71079 is divided by 23 = 9

Smallest number to add = 23 − 9 = 14

Therefore The correct answer is 14.

Alternate Method

Given:

Dividend = 71079

Divisor = 23

Formula Used:

Smallest number to be added = Divisor − Remainder

Calculations:

=> To find the required number, we first divide 71079 by 23 to get the remainder.

=> 71079 = (23 × 3090) + 9

=> From the division above, we find that the remainder is 9.

=> Smallest number to be added = Divisor − Remainder

=> Smallest number to be added = 23 − 9

=> Smallest number to be added = 14

Therefore The correct answer is 14.

Additional Information

Division Algorithm

Dividend = (Divisor × Quotient) + Remainder.

Smallest Number to Add

To make a number completely divisible by a given divisor, the smallest positive number to be added is determined by the formula: (Divisor − Remainder).

Smallest Number to Subtract

If the question asks for the smallest number to be subtracted to make it completely divisible, the answer is simply the Remainder itself.

Q65. Answer: (d) Rs. 57,600

Shortcut Trick

M's profit = (7696 + 962) ÷ 2 = Rs. 4329, N's profit = (7696 − 962) ÷ 2 = Rs. 3367.

Profit ratio of M : N = 4329 : 3367 = 9 : 7.

Capital ratio = (Profit_M ÷ Time_M) : (Profit_N ÷ Time_N) = (9 ÷ 3) : (7 ÷ 4) = 12 : 7.

Difference in capital ratio = 12 − 7 = 5 units.

5 units = Rs. 24,000 => 1 unit = Rs. 4,800 => M's capital (12 units) = Rs. 57,600.

Therefore The correct answer is Rs. 57,600.

Alternate Method

Given:

Total profit = Rs. 7,696

Difference in profit = Rs. 962

Time of investment for M = 3 months

Time of investment for N = 4 months

M's investment is Rs. 24,000 more than N's investment.

Formula Used:

Profit Ratio = (Capital × Time) Ratio

Partner M

Capital: 12 units

Time: 3 months

Profit: 9 units

Partner N

Capital: 7 units

Time: 4 months

Profit: 7 units

Difference: 5 units = Rs. 24,000

Calculations:

=> Let M's profit be P_M and N's profit be P_N.

=> P_M + P_N = 7696

=> P_M − P_N = 962

=> Adding both equations: 2 × P_M = 8658 => P_M = 4329

=> Subtracting both equations: 2 × P_N = 6734 => P_N = 3367

=> Profit ratio of M to N = 4329 : 3367

=> Simplifying by dividing both numbers by 481, we get the profit ratio = 9 : 7

=> Let Capital of M and N be C_M and C_N.

=> (C_M × 3) ÷ (C_N × 4) = 9 / 7

=> C_M / C_N = (9 / 3) × (4 / 7) = 3 × (4 / 7) = 12 / 7

=> Let C_M = 12x and C_N = 7x

=> Difference in capital = 12x − 7x = 5x

=> Given, 5x = 24000 => x = 4800

=> Capital contributed by M = 12x = 12 × 4800 = 57600

Therefore The correct answer is Rs. 57,600.

Additional Information

Partnership Profit Division

In a partnership business, the profit earned is distributed among the partners in direct proportion to the product of their investment capital and the time period of investment.

Capital Ratio Calculation

If the profit ratio and time ratio are known, the capital ratio can be calculated directly by dividing the profit share by the respective time period (Capital = Profit ÷ Time).

Active vs Sleeping Partner

An active partner is one who actively manages the business and usually receives an extra fixed percentage of profit for their work, whereas a sleeping partner only receives a share based directly on their capital and time invested.

Q66. Answer: (a) 4316/719 hours

Shortcut Trick

Total capacity of the tank = LCM of time taken individually (19, 21, and 8) = 3192 units.

Individual efficiencies: Pipe A = 3192 ÷ 19 = 168, Pipe B = 3192 ÷ 21 = 152, Pipe C = 3192 ÷ 8 = 399.

Combined efficiency when they operate together = 168 + 152 + 399 = 719 units/hr.

Total time taken = Total capacity ÷ Combined efficiency = 3192 ÷ 719 = 4 ^(316)/719 hours.

Therefore The correct answer is 4 ^(316)/719 hours.

Alternate Method

Given:

Time taken by Pipe A = 19 hours

Time taken by Pipe B = 21 hours

Time taken by Pipe C = 8 hours

Formula Used:

Total Work = LCM of individual times

Efficiency = Total Work ÷ Time

Pipe	Hours	Total Work	Efficiency
A	19	3192	168
B	21	152	
C	8	399	

Calculations:

=> Total combined efficiency of A, B, and C = 168 + 152 + 399 = 719 units/hour

=> Total time taken by the three pipes operating together = Total Work ÷ Total Efficiency

=> Total time taken = 3192 ÷ 719

=> Total time taken = 4 ^(316)/719 hours

Therefore The correct answer is 4 ^(316)/719 hours.

Additional Information

Inlet vs Outlet Pipes

An inlet pipe fills the tank and is assigned a positive efficiency, whereas an outlet pipe empties the tank and is assigned a negative efficiency. The net combined efficiency is the algebraic sum of their separate efficiencies.

Fractional Work Method

If distinct pipes can fill a tank in x, y, and z hours respectively, the portion of the tank filled by them in 1 hour working collectively is (1/x + 1/y + 1/z). The complete fill time is the reciprocal of this calculated sum.

Work Equivalency Principle

In scenarios with identical pipes, Total Work = Number of Pipes × Time taken × Efficiency per individual pipe. This proportional rule directly simplifies complex scaling problems.

Q67. Answer: (d) 3

Shortcut Trick

To check divisibility by 3, simply calculate the sum of all digits in the number.

Sum of digits of 934725 = 9 + 3 + 4 + 7 + 2 + 5 = 30.

Since 30 is completely divisible by 3, the entire number 934725 is also divisible by 3.

Since the last digit is 5 (an odd number), it cannot be divided by 2, 6, or 10.

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Therefore The correct answer is 3.

Alternate Method

Given:

Number = 934725

Method Used:

Apply the standard divisibility rules for each given option.

Calculations:

=> Divisibility by 2: The last digit must be an even number (0, 2, 4, 6, 8).

=> The last digit of 934725 is 5 (odd), so it is not divisible by 2.

=> Divisibility by 6: The number must be divisible by both 2 and 3.

=> Since it is not divisible by 2, it is not divisible by 6.

=> Divisibility by 10: The last digit must be 0.

=> The last digit is 5, so it is not divisible by 10.

=> Divisibility by 3: The sum of the digits must be a multiple of 3.

=> Sum of digits = 9 + 3 + 4 + 7 + 2 + 5 = 30

=> 30 ÷ 3 = 10 (perfectly divisible)

=> Hence, the number 934725 is divisible by 3.

Therefore The correct answer is 3.

Additional Information

Divisibility by 4

A number is divisible by 4 if the number formed by its last two digits is perfectly divisible by 4.

Divisibility by 5

A number is completely divisible by 5 if its last digit is either 0 or 5.

Divisibility by 9

A number is divisible by 9 if the sum of all its individual digits is a multiple of 9.

Divisibility by 11

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

Q68. Answer: (b) 5,250

Shortcut Trick

Let Cost Price (CP) = 100%. Then List Price (MP) = 150%.

Selling Price (SP) = 150% × (100% − 30%) = 105%.

Profit = SP − CP = 105% − 100% = 5%.

Given, 5% = Rs. 175 => 1% = Rs. 35.

List Price (MP) = 150% = 150 × 35 = 5250.

Therefore The correct answer is Rs. 5,250.

Alternate Method

CP = 100x

SP = 105x

MP = 150x

Mark Up = +50%

Discount = −30%

Profit = +5x

Profit = 5x = Rs. 175 => x = 35

Given:

Markup Percentage = 50%

Discount Percentage = 30%

Profit = Rs. 175

Formula Used:

List Price (MP) = CP × (1 + Markup% ÷ 100)

Selling Price (SP) = MP × (1 − Discount% ÷ 100)

Profit = SP − CP

Calculations:

=> Let the Cost Price (CP) of the fan be 100x.

=> List Price (MP) = 100x × (1 + 50 ÷ 100) = 150x

=> Selling Price (SP) = 150x × (1 − 30 ÷ 100) = 150x × 0.7 = 105x

=> Profit = SP − CP = 105x − 100x = 5x

=> We are given that Profit = Rs. 175, so:

=> 5x = 175

=> x = 35

=> List Price (MP) = 150x = 150 × 35 = 5250

Therefore The correct answer is Rs. 5,250.

Additional Information

Marked Price (MP) and Successive Discounts

MP is the printed or listed price of an item. For successive discounts of a% and b%, Effective Discount = (a + b − ab ÷ 100)%.

Direct Relation between CP and MP

The direct ratio between Cost Price and Marked Price is derived as: CP ÷ MP = (100 − Discount%) ÷ (100 + Profit%).

Dishonest Dealer

When a shopkeeper sells goods at CP but uses false weights, Profit % = (Error ÷ (True Weight − Error)) × 100.

Q69. Answer: (b) 44

Shortcut Trick

The mean proportional between two numbers is simply the square root of their product.

Mean proportional = √(22 × 88)

Mean proportional = √(22 × 22 × 4)

Mean proportional = 22 × 2 = 44

Therefore The correct answer is 44.

Alternate Method

Given:

First number = 22

Second number = 88

Formula Used:

Let the mean proportional be x. The relation of proportion is written as First number : x :: x : Second number.

22

:

x

::

88

Ratio 1

Ratio 2

x = √(22 × 88)

Calculations:

=> 22 : x = x : 88

=> 22 / x = x / 88

=> x^2 = 22 × 88

=> x^2 = 1936

=> x = √1936

=> x = 44

Therefore The correct answer is 44.

Additional Information

Third Proportional

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

Fourth Proportional

If a : b = c : d, then d is the fourth proportional to a, b, and c. Formula: d = (b × c) ÷ a.

Duplicate Ratio

The duplicate ratio of a : b is given by $a^2 : b^2$.

Sub-duplicate Ratio

The sub-duplicate ratio of a : b is given by √a : √b.

Q70. Answer: (a) 99

Shortcut Trick

We know that the product of two numbers is equal to the product of their H.C.F. and L.C.M.

=> First Number × Second Number = H.C.F. × L.C.M.

=> 55 × Second Number = 11 × 495

=> Second Number = (11 × 495) ÷ 55

=> Second Number = 495 ÷ 5 = 99

Therefore The correct answer is 99.

Alternate Method

Given:

H.C.F. of two numbers = 11

L.C.M. of two numbers = 495

One of the numbers = 55

Formula Used:

Product of two numbers = Product of their H.C.F. and L.C.M.

Calculation:

Let the second number be x.

=> 55 × x = 11 × 495

=> x = (11 × 495) ÷ 55

=> x = 495 ÷ 5

=> x = 99

Therefore The correct answer is 99.

Additional Information

H.C.F. and L.C.M. of Fractions

H.C.F. = (H.C.F. of Numerators) ÷ (L.C.M. of Denominators)

L.C.M. = (L.C.M. of Numerators) ÷ (H.C.F. of Denominators)

Co-prime Numbers

Two numbers are said to be co-prime if their H.C.F. is exactly 1. The L.C.M. of co-prime numbers is always equal to their product.

Divisibility Property

The H.C.F. of any given set of numbers is always a direct factor of their L.C.M.

Q71. Answer: (d) Three

Given: Seven people, A, B, C, D, P, Q and R, are sitting in a row, facing north.

1) Only three people sit to the left of R.

2) Only A sits to the right of C.

3) Only three people sit between C and Q.

4) B sits at some place to the left of P but at some place to the right of D.

So, Three people sit between D and P.

Hence, the correct answer is "Option 4".

Q72. Answer: (b) 1

The logic followed here is:

‘PICK’ is coded as ‘3517’

‘COST’ is coded as ‘2146’

Words: PICK and COST — common letter = C.

Codes: 3517 and 2146 — common digit = 1.

So, 1 is the code for ‘C’ in the given code language.

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Hence, the correct answer is 'Option 2'.

Q73. Answer: (b) Mother's mother

Family Chart:

Decoding the Symbols:

Symbol	#	%	•	@
Meaning	Mother	Brother	Wife	Father

Given: C - O @ M # B % U

It means: C is the Wife of O, O is the Father of M, M is the Mother of B, B is the Brother of U.

So, C is the 'Mother's mother' of U.

Hence, the correct answer is "Option 2".

Q74. Answer: (b) 31

BODMAS Table:

Given equation: 2 + 8 ÷ 84 − 7 × 27 = ?

Now, if '+' and '-' and '×' and '÷' are interchanged, then:

=> 2 × 8 − 84 ÷ 7 + 27 = ?

=> 16 − 12 + 27 = ?

=> 4 + 27 = 31.

Hence, the correct answer is "Option 2".

Q75. Answer: (c) 8

The logic followed here is:

'CURE' is coded as '8426'

'THOU' is coded as '5183'

Words: CURE and THOU — the only common letter is U.

Codes: 8426 and 5183 — the only common digit is 8.

So, 8 is the code for 'U' in the given code language.

Hence, the correct answer is 'Option 3'.

Q76. Answer: (a) COIR - OICR - RIOC

Now,

LUNG - UNLG - GNUL

FERN - ERFN - NREF

Let's check each Option One by One.

Option 1) COIR - OICR - RIOC

C	O	I	R
1	2	3	4
O	I	C	R
2	3	1	4
R	I	O	C
4	3	2	1

Option 2) SWAP - SAWP - PAWS

S	W	A	P
1	2	3	4
S	A	W	P
1	3	2	4
P	A	W	S

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4	3	2	1

Option 3) BAKE - AKBE - AKEB

B	A	K	E
1	2	3	4
A	K	B	E
2	3	1	4
A	K	E	B
2	3	4	1

Option 4) CUTS - UCTS - SUTC

C	U	T	S
1	2	3	4
U	C	T	S
2	1	3	4
S	U	T	C
4	2	3	1

So, Only COIR - OICR - RIOC follows the pattern of given letter cluster.

Hence, the correct answer is 'Option 1'.

Q77. Answer: (a) ORK

The logic followed here is:

Option 1) ORK

Option 2) RUO

Option 3) ILF

Option 4) LOI

Here, 'ORK' is odd among the given options.

Hence, the correct answer is "Option 1".

Q78. Answer: (c) Both Conclusions I and II follow

The least possible Venn diagram for the given statement is:

Conclusions:

I. Some computers are desktops → True (As some laptops are desktops and all laptops are computers. So some part of desktops is common wit laptops, which whole comes in computers, therefore it is true)

II. Some desktops are laptops → True (As some laptops are desktops. So some part of desktops is common wit laptops, therefore it is true)

Thus, both Conclusion I and Conclusion II follow.

Hence, the correct answer is "Option 3".

Q79. Answer: (a) 39

BODMAS Table:

Given equation: 36 + 48 × 4 ÷ 5 - 3 = ?

Now, if '+' and '-' and '×' and '÷' are interchanged, then:

=> 36 − 48 ÷ 4 + 5 × 3 = ?

=> 36 − 12 + 15 = ?

=> 24 + 15 = 39.

Hence, the correct answer is "Option 1".

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Q80. Answer: (a) 102

The logic followed here is:

thus, "1 02" will replace the question mark in the given series.

Hence, the correct option is "Option 1".

Q81. Answer: (b) TP-US

The logic followed here is:

Option 1) NJ-OL

Option 2) TP-US

Option 3) QM-RO

Option 4) KG-LI

Here, 'TP-US' is odd among the given options.

Hence, the correct answer is "Option 2".

Q82. Answer: (b) Neither conclusion (I) nor (II) follows.

Given Statements:

All Steel are Nickel.

Some Nickel are Chromium.

The least possible Venn diagram for the given statement is:

Conclusions:

I Some Steel are Chromium:

In Case 1, the Steel and Chromium circles do not overlap. Thus, "Some Steel are Chromium" is False.

Since the conclusion is false in at least one possible diagram, it is not definitively true.

Conclusion I does not follow.

II No Chromium are Steel:

In Case 2, the Chromium and Steel circles overlap. Thus, "No Chromium are Steel" is False.

Since the conclusion is false in at least one possible diagram, it is not definitively true.

Conclusion II does not follow.

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

Hence, the correct answer is "Option 2".

Q83. Answer: (a) 72

Given:

Samar's rank from the top = 39th

Samar's rank from the bottom = 34th

Total students = Rank from top + Rank from bottom − 1

So, Total = = 39 + 34 − 1 = 72

So, there are 72 students in Samar’s class.

Hence, the correct answer is "Option 1".

Q84. Answer: (a) 8 km towards the east

Given:

Ram starts his journey from point A and drives for 12 km towards the south.

He then turns right and drives for 7 km.

He then turns left, drives for 5 km, then again turns left and drives for 13 km, and then again turns left and drives for 9 km.

He then turns left and drives for 14 km.

He takes a final right turn and drives for 8 km and stops.

So, He should drive 8 km towards the east in order to reach point A again.

Hence, the correct answer is "Option 1".

Q85. Answer: (c) VPS

The logic followed here is:

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

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Hence, the correct answer is "Option 3".

Q86. Answer: (b) Two

Given: (Left) 0 3 # π 2 σ Ω 9 $ # 4 8 9 % 1 & 5 @ 8 6 μ (Right)

Now,

Symbols which are immediately preceded by a prime number and also immediately followed by a symbol.

So, Needed pattern is: Prime Number - Symbol - Symbol.

There are Two Symbols which are immediately preceded by a prime number and also immediately followed by a symbol.

Hence, the correct answer is 'Option 2'.

Q87. Answer: (b) Teena

Given: Teena, Beena, Meera, Leena, Meenu and Reena are sitting around a circle, facing the centre.

1) Reena sits second to the left of Teena.

2) Meenu sits third to the left of Reena.

3) Leena sits second to the left of Meera.

Here, Teena sits second to the left of Beena.

Hence, the correct answer is "Option 2".

Q88. Answer: (a) JUF : KWI

The position and positional values or English Alphabets are:

Now,

EYN : FAQ

GWA : HYD

Let's check each Option One by One.

Option 1) JUF : KWI

Option 2) SBL : TEM

Not follow the pattern

Option 3) TQH : WSI

Not follow the pattern

Option 4) OCR : PDS

Not follow the pattern

So, Only JUF : KWI follows the pattern of given letter cluster.

Hence, the correct answer is 'Option 1'.

Q89. Answer: (d) 11

Given: (Left) 438 745 217 153 876 (Right)

Now,

Number: 438, 745, 217, 153, 876

Highest number = 876

Third digit of 876 = 6

Lowest number = 153

Second digit of 153 = 5

Required sum = 6 + 5 = 11

Hence, the correct answer is 'Option 2'.

Q90. Answer: (d) IM-DH

The logic followed here is:

Option 1) RV-MP

Option 2) NR-IL

Option 3) KO-FI

Option 4) IM-DH

Here, 'IM-DH' is odd among the given options.

Hence, the correct answer is "Option 4".

Q91. Answer: (a) GANY - AGNY - GNYA

Now,

POST - OPST - PSTO

LITE - ILTE - LTEI

Let's check each Option One by One.

Option 1) GANY - AGNY - GNYA

G	A	N	Y
1	2	3	4
A	G	N	Y
2	1	3	4
G	N	Y	A
1	3	4	2

Option 2) HOST - OHST - OSTH

H	O	S	T
1	2	3	4
O	H	S	T
2	1	3	4
O	S	T	H
2	3	4	1

Option 3) VAIN - VIAN - NIAV

V	A	I	N
1	2	3	4
V	I	A	N
1	3	2	4
N	I	A	V
4	3	2	1

Option 4) MIND - IMND - DINM

M	I	N	D
1	2	3	4
I	M	N	D
2	1	3	4
D	I	N	M
4	2	3	1

So, Only GANY - AGNY - GNYA follows the pattern of given letter cluster.

Hence, the correct answer is 'Option 1'.

Q92. Answer: (a) (50, 2514, 15)

The logic followed here is:

Logic: middle = last + (first)^2 − 1

(19, 374, 14)

=> 14 + 19^2 − 1

= 14 + 361 − 1 = 374

(47, 2230, 22)

=> 22 + 47^2 − 1

= 22 + 2209 − 1 = 2230

Now, checking the options:

Option 1) (50, 2514, 15)

=> 15 + 50^2 − 1

= 15 + 2500 − 1 = 2514

Option 2) (27, 744, 11)

=> 11 + 27^2 − 1 = 11 + 729 − 1 = 739 → not 744

Option 3) (45, 2031, 2)

=> 2 + 45^2 − 1 = 2 + 2025 − 1 = 2026 → not 2031

Option 4) (4, 22, 2)

=> 2 + 4^2 − 1 = 2 + 16 − 1 = 17 → not 22

Hence, the correct option is "Option 1"

Q93. Answer: (a) 740

The logic followed here is:

thus, "740" will replace the question mark in the given series.

Hence, the correct option is "Option 1".

Q94. Answer: (b) 30

Given:

Navish's rank from the top = 17th

Navish's rank from the bottom = 14th

Total students = Rank from top + Rank from bottom − 1

So, Total students = 17 + 14 − 1 = 30

Hence, the correct answer is "Option 2".

Q95. Answer: (a) 45 D 6 B 8 C 42 A 2

BODMAS Table:

Given:

A → ÷

B → ×

C → +

D → −

Now,

Option 1: 45 D 6 B 8 C 42 A 2

= 45 − 6 × 8 + 42 ÷ 2 = 45 − 48 + 21 = -3 + 21 = 18 (Correct)

Option 2: 45 C 6 A 8 B 42 A 2

= 45 + 6 ÷ 8 × 42 ÷ 2 = 45 + 15.75 = 60.75 (Not 18)

Option 3: 45 B 6 C 8 D 42 A 2

= 45 × 6 + 8 − 42 ÷ 2 = 270 + 8 − 21 = 257 (Not 18)

Option 4: 45 A 6 B 8 D 42 C 2

= 45 ÷ 6 × 8 − 42 + 2 = 60 − 42 + 2 = 20 (Not 18)

Hence, the correct answer is "Option 1".

Q96. Answer: (b) XEL 49

The logic followed here is:

So, 'XEL 49' will replace the question mark in the given series.

Hence, the correct answer is "Option 2".

Q97. Answer: (d) 2 km to west

Given:

Vinay starts from Point A and drives 8 km towards North.

He then takes a left turn, drives 4 km, turns left and drives 11 km.

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He then takes a left turn and drives 6 km.
He takes a final left turn, drives 3 km and stops at Point P.
So, He should drive 2 km to west in order to reach Point A again.
Hence, the correct answer is "Option 4".

Q98. Answer: (b) R

Given: Seven boxes V, W, X, Y, Z, Q and R are kept one over the other but not necessarily in the same order.
1) Only four boxes are kept between Z and Y.
2) Only X is kept above Z.
3) Only two boxes are kept between W and V.
4) R is kept immediately above Q.
5) V is not kept immediately above R.

X
Z
W
R
Q
V
Y

So, The box is kept fourth from the top is R.
Hence, the correct answer is "Option 2".

Q99. Answer: (a) 9

Given numbers: 8127365
Digits: 8, 1, 2, 7, 3, 6, 5
Ascending Order: 1 2 3 5 6 7 8
Now,
Second from the left → 2
Second from the right → 7
Sum = 2 + 7 = 9
Hence, the correct answer is 'Option 1'.

Q100. Answer: (a) 69

The logic followed here is:
thus, "69" will replace the question mark in the given series.
Hence, the correct option is "Option 1".

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