RRB NTPC (UG) CBT-I Official Paper (Held On: 08 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. Under Article 239 of the Constitution, a Union Territory is administered by:

(a) the Governor of an adjacent State
(b) the Prime Minister of India
(c) the Parliament of India
(d) the President of India

Q2. Which body is entrusted with recruiting India’s civil servants on the basis of merit?

(a) The President’s Secretariat
(b) State Governments through District Boards
(c) The Union Public Service Commission
(d) The Election Commission of India

Q3. Which renewable energy source is dependent on the gravitational pull of the moon?

(a) Wind energy
(b) Biomass energy
(c) Solar energy
(d) Tidal energy

Q4. Which Indian Light Tank (ILT) has achieved a major feat in December 2024 by firing multiple rounds at various ranges at an altitude of over 4200 m?

(a) Zorawar
(b) Yuvraj
(c) Dhruv
(d) Amar

Q5. Which sectors were emphasised in the Eighth Five-Year Plan for employment generation?

(a) Automotive and steel industries
(b) IT and software services
(c) Banking and finance
(d) Animal husbandry, fishery, horticulture and rural industries

Q6. The inaugural edition of India's first major naval exercise 'AIKEYME' was held off the coast of which African country in April 2025?

(a) Tanzania
(b) Seychelles
(c) Kenya
(d) Comoros

Q7. In 2025, which city in France hosted the French Open tennis tournament?

(a) Lyon
(b) Marseille
(c) Paris
(d) Nice

Q8. Which novel macrolide antibiotic, highlighted in a December 2024 PIB factsheet, is being positioned as India's first indigenous drug against community-acquired pneumonia?

(a) Nafithromycin
(b) Pretomanid
(c) Lefamulin
(d) Delafloxacin

Q9. Who were the Voharikas in the judicial structure of the Magadha period?

(a) Local tax collectors
(b) Judges in village assemblies
(c) Lawyer-Judges
(d) Military generals

Q10. Cabinet minister Kinjarapu Ram Mohan Naidu was related to which ministry in May 2025, who was named in the World Economic Forum (WEF) Young Global Leaders list 2025?

(a) Ministry of Housing and Urban Affairs
(b) Ministry of Commerce and Industry
(c) Ministry of Civil Aviation
(d) Ministry of Corporate Affairs

Q11. To change the desktop wallpaper, which option would you choose?

(a) Settings > Devices
(b) Settings > Personalization
(c) Settings > Ease of Access
(d) Settings > Apps

Q12. When did the Hershey-Chase experiment provide solid evidence that DNA, not proteins, is the genetic material?

(a) 1957
(b) 1952
(c) 1950
(d) 1946

Q13. The President of India, Droupadi Murmu, conferred which Jnanpith Award on the Sanskrit scholar Jagadguru Rambhadracharya in May 2025?

(a) 62^(nd)
(b) 58^(th)
(c) 48^(th)
(d) 52^(nd)

Q14. In which of the following shooting events (in distance) did Simranpreet Kaur Brar win silver medal in the women's category at ISSF World Cup 2025, Lima?

(a) 25m
(b) 75 m
(c) 50 m
(d) 100 m

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Q15. Which Article of the Indian Constitution directs the State to promote the welfare of the people?

(a) Article 43
(b) Article 47
(c) Article 38
(d) Article 42

Q16. What is the main function of RAM in a computer?

(a) To provide temporary storage for running programs
(b) To control the printer
(c) To store permanent data
(d) To process graphics

Q17. Which indigenously developed missile was successfully test fired by DRDO and Indian Navy on 26 March 2025?

(a) Short-Range Sea-to-Surface (Coast) Missile
(b) Advanced Short Range Air-to-Air Missile
(c) Short-Range Anti-Tank Missile
(d) Vertically Launched Short-Range Surface-to-Air Missile

Q18. In which chronic disease do the inner walls of the lungs' air sacs, called alveoli, become damaged, causing them to eventually burst?

(a) Emphysema
(b) Dyspepsia
(c) Arrhythmias
(d) Cystic fibrosis

Q19. Who is known as the 'Grand Old Man of India' and promoted Indian economic nationalism?

(a) Dadabhai Naoroji
(b) Lala Lajpat Rai
(c) Gopal Krishna Gokhale
(d) Surendranath Banerjee

Q20. Which range is known for its rich biodiversity and is a UNESCO World Heritage Site?

(a) Satpura Range
(b) Western Ghats
(c) Eastern Ghats
(d) Chotanagpur plateau

Q21. Which of the following organs represents the female reproductive part of a flower in angiosperms?

(a) Petal
(b) Androecium
(c) Gynoecium
(d) Stamen

Q22. _____ serves as the conventional base material for the art form known as Kalamkari.

(a) Metal
(b) Wood
(c) Paper
(d) Cloth

Q23. In which of the following years was the Bengal Sati Regulation enacted?

(a) 1837
(b) 1818
(c) 1829
(d) 1858

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Q24. Which of the following correctly describes the Planning Commission of India?

(a) A constitutional body established by an Article of the Constitution.
(b) A statutory body created by an Act of Parliament in 1950.
(c) A constitutional commission chaired by the Chief Justice of India.
(d) An extra-constitutional advisory body created by a government resolution in 1950.

Q25. [October 2024] Mongla Port, recently seen in the news for strategic development and trade ties, is located in which country?

(a) India
(b) Bangladesh
(c) Sri Lanka
(d) Myanmar

Q26. Which Indian institution has developed an affordable device that is capable of rapidly separating plasma from blood and purifying water, priced at Rs. 1,000?

(a) IIIT-Allahabad
(b) IIT Kanpur
(c) IIT Hyderabad
(d) IISc Bangalore

Q27. In 2025, which of the following institutes developed the paper-based technology 'Freshness Keeper' to extend the freshness of cut flowers?

(a) Indian Institute of Horticulture Research
(b) IIT Madras
(c) IIT Bombay
(d) CSIR-Central Food Technological Research Institute

Q28. Which of the following rivers is associated with National Waterway 10 (NW-10)?

(a) Brahmaputra river
(b) Amba river
(c) Chambal river
(d) Yamuna river

Q29. A free trade arrangement of the SAARC countries, the South Asian Free Trade Area (SAFTA), came into force in which year?

(a) 2006
(b) 2018
(c) 2010
(d) 2000

Q30. The association of Devi Chaudhurani and Bhawani Pathak with the Fakir-Sanyasi rebellion in India indicates which of the following?

(a) These rebellions were purely religious in nature.
(b) There was participation of all religions and genders in this rebellion.
(c) In Bengal, only tribal groups led such resistance.
(d) The movement was dominated by the upper caste elite.

Q31. Barapani Lake of Shillong is also known as _____.

(a) Umiam Lake
(b) Shilloi Lake
(c) Haflong Lake
(d) Jaisamand Lake

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Q32. Who is the head of the civil administration of a district court in India?

(a) Chief Judicial Magistrate
(b) District Judge
(c) District Collector
(d) Registrar General of the High Court

Q33. In which of the following years was the National Seeds Policy launched?

(a) 2007
(b) 2010
(c) 2002
(d) 2018

Q34. Decathlon, which set up its first outlet in India in Bengaluru in 2009, is a _____.

(a) Swedish sports goods retailer
(b) German sports goods retailer
(c) Chinese sports goods retailer
(d) French sports goods retailer

Q35. Volcanoes are often found in which type of plate boundary?

(a) Convergent and transform boundaries only
(b) Divergent boundaries only
(c) Convergent and divergent boundaries
(d) Transform boundaries only

Q36. What was the official theme of India's 76th Republic Day Parade held on January 26, 2025?

(a) Har Ghar Tiranga: Unity in Diversity
(b) Digital Bharat: Future Forward
(c) Viksit Bharat: Innovation & Inclusion
(d) Swarnim Bharat: Virasat aur Vikas

Q37. What is a notable characteristic of the carvings found at the entrances of the Sanchi Stupa?

(a) Mauryan royal figures
(b) Jataka story narratives
(c) Buddha's post-enlightenment life
(d) Mythical creatures like yakshas and kinnaras

Q38. In 2025, which two countries were involved in renewed tensions over the South China Sea, prompting international concern about maritime security?

(a) India and Pakistan
(b) USA and Iran
(c) China and Philippines
(d) Russia and Ukraine

Q39. During the Satavahana Empire, the terms 'Ahara' or 'Rashtra' referred to

(a) temple land
(b) tax officer
(c) Capital
(d) District

Q40. Which government initiative primarily focuses on improving human development by ensuring healthcare and nutrition for women and children?

(a) Digital India
(b) Beti Bachao, Beti Padhao
(c) Skill India Mission
(d) Poshan Abhiyaan

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MATHEMATICS

Q41. The angles of elevation of the top of a tower from two points X and Y (on opposite sides of the tower) at distances b^2 m and a^2 m, respectively, from the base and in the same straight line with it are complementary. The height (in m) of the tower is _____.

(a) ab ^(1/2)
(b) (ab)^(1/2)
(c) ba^(1/2)
(d) ab

Q42. Find the value of [954 ÷ {30 + 9 × (3 − 6)}].

(a) 319
(b) 318
(c) 313
(d) 321

Q43. Prashant and Nisha have to travel from Delhi to Kanpur in their respective cars. Prashant is driving at 117 km/hr while Nisha is driving at 48 km/hr. Find the time taken by Nisha to reach Kanpur if Prashant takes 16 hours.

(a) 39 hours
(b) 44 hours
(c) 45 hours
(d) 36 hours

Q44. If the interest earned during the 2nd year on a certain sum is Rs. 2,352, and the rate of interest is 5% per annum compounded annually, then the sum is:

(a) Rs. 44,035
(b) Rs. 44,855
(c) Rs. 44,800
(d) Rs. 45,115

Q45. The sides of a triangle are 82 cm, 18 cm, and 80 cm. What is its area? (in cm^2)

(a) 670
(b) 712
(c) 731
(d) 720

Q46. By how much is 65% of 65 greater than (1)/(5) of 15?

(a) 36.25
(b) 37.25
(c) 33.25
(d) 39.25

Q47. Jaya can do a certain piece of work in 30 days. Jaya and Sushma can together do the same work in 21 days, and Jaya, Sushma and Hina can do the same work together in 14 days. In how many days can Jaya and Hina do the same work together?

(a) (35)/(2)
(b) (31)/(3)
(c) (44)/(2)
(d) (27)/(4)

Q48. An item marked at Rs. 5,000 is given at successive discounts of 10% and 5%. Find the final selling price.

(a) Rs. 4,320
(b) Rs. 4,250
(c) Rs. 4,275
(d) Rs. 4,350

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Q49. M and N start a business. M invests Rs. 46,000 more than N for 3 months and N invests for 4 months. M's share is Rs. 453 more than that of N, out of a total profit of Rs. 1,359. Find the capital contributed by M.

(a) Rs. 73,608
(b) Rs. 73,516
(c) Rs. 73,715
(d) Rs. 73,600

Q50. Find the mean proportional between 24 and 150.

(a) 60
(b) 70
(c) 40
(d) 50

Q51. Train A leaves station M at 8:25 AM and reaches station N at 3:25 PM on the same day. Train B leaves station N at 10:25 AM and reaches station M at 3:25 PM on the same day. Find the time when trains A and B meet.

(a) 12:50 PM
(b) 12:30 PM
(c) 11:30 AM
(d) 11:10 AM

Q52. The number 327087 is divisible by which of the following?

(a) 5
(b) 8
(c) 3
(d) 12

Q53. Find the greatest number that will divide 49, 97 and 189 so as to leave the same remainder in each case.

(a) 5
(b) 4
(c) 7
(d) 3

Q54. Simplify: $3((7/3)\ x^2 - 25x + 12) - 7(x^2 + 9x - 13)$

(a) 138x127
(b) - 138x + 127
(c) 138x + 127
(d) -138x-127

Q55. The selling price of 20 books is equal to the cost price of 5 books. Find the loss or gain percentage.

(a) (100)/(15)% gain
(b) (100)/(15)%% loss
(c) 75% gain
(d) 75% loss

Q56. A can do a work in 12 days and B can do the same work in 18 days. If they work on it together for 4 days, then what fraction of the work is left?

(a) (4)/(9)
(b) (11)/(9)
(c) (14)/(9)
(d) (13)/(9)

Q57. ABCD is a trapezium in which BC || AD and AC = CD. f angle ABC = 19º and angle BAC = 137º, then what is the measure of angle ACD (in degree)?

(a) 120º
(b) 128º

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(c) 132º
(d) 131º

Q58. If the 6-digit number N83M92 is divisible by 11, then which of the options below can give a possible correct relation between M and N?
(a) M + N = -2
(b) M - N = 2
(c) M - N = 1
(d) M = N

Q59. A shopkeeper buys a bicycle for Rs. 3,500 and sells it at a 20% discount, incurring no profit or loss. What is the marked price of the bicycle?
(a) Rs. 3,475
(b) Rs. 5,374
(c) Rs. 7,343
(d) Rs. 4,375

Q60. The value of $10^2 + \sqrt{(2^2)} - 4\sqrt{25} - 3$ is
(a) 69
(b) 81
(c) 79
(d) 78

Q61. Find the area of a triangle with base 12 cm and height 8 cm.
(a) 72 cm2
(b) 60 cm2
(c) 48 cm2
(d) 96 cm2

Q62. Three years ago, the father was 24 years older than twice his son's age. How many years from now will his age be twice his son's age?
(a) 19
(b) 23
(c) 25
(d) 21

Q63. The cost of 12 pens and 7 pencils is Rs. 285. If the cost of a pen decreases by Rs. 6 and the cost of a pencil increases by Rs. 5, then the cost of 11 pens and 3 pencils is Rs. 118. What is the original cost of 2 pens and 2 pencils?
(a) Rs. 68
(b) Rs. 66
(c) Rs. 73
(d) Rs. 70

Q64. Find the simple interest (in Rs.) on Rs. 1,200 at an interest rate of 4% per month for 9 months.
(a) Rs. 56
(b) Rs. 432
(c) Rs. 36
(d) Rs. 72

Q65. Nitin bought some pencils at the rate of Rs. 180 a dozen. He sold them for Rs. 17 each. His profit percentage is _____%. (Round off to two decimal places.)
(a) 11.33
(b) 17.33
(c) 15.33
(d) 13.33

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Q66. The sum of five numbers is 655. The average of the first two numbers is 80 and the third number is 109. Find the average of the remaining two numbers.

(a) 190
(b) 194
(c) 193
(d) 189

Q67. An amount of Rs. 658 is divided among three persons in the ratio of 18 : 12 : 2. The difference between the largest and the smallest shares (in Rs.) in the distribution is:

(a) 329
(b) 426
(c) 261
(d) 242

Q68. The number 444348269 is divisible by which of the following?

(a) 10
(b) 19
(c) 12
(d) 9

Q69. The current population of a town is 14,680. It increases by 25% and 70% in two successive years but decreases by 20% in the third year. What is the population of the town at the end of the third year?

(a) 24,956
(b) 24,960
(c) 24,953
(d) 24,958

Q70. The average runs scored by a batsman in 23 matches is 42. In the next 10 matches, the batsman scored an average of 15 runs. Find his average runs scored (rounded off to two decimal places) in all the 33 matches.

(a) 32.82
(b) 34.82
(c) 33.82
(d) 35.82

GENERAL INTELLIGENCE AND REASONING

Q71. Each of the digits in the number 71642938 is arranged in ascending order from left to right. The position of how many digits will remain unchanged as compared to that in the original number?

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

Q72. A, B, C, D, E, F and G are sitting around a circular table facing the centre. B sits third to the right of E. F sits to the immediate left of B. C is the immediate neighbour of A and B. G is not the immediate neighbour of F. How many people sit between D and G when counted from the left of G?

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

Q73. What will come in place of the question mark (?) in the following equation, if '+' and '×' are interchanged and '−' and '÷' are interchanged? 38 ÷ 7 + 5 × 20 − 4 = ?

(a) 22
(b) 27

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(c) 8
(d) 15

Q74. In a certain code language,

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

A – B means 'A is the wife of B',

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

A ÷ B means 'A is the brother of B'.

How is A related to S if 'A + E – F x N ÷ S'?

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

Q75. If 2 is added to each even digit and 2 is added to each odd digit in the number 7145362, what will be the sum of the last two and first two digits in the new number thus formed?

(a) 25
(b) 24
(c) 26
(d) 27

Q76. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

All physicists are chemists.

No chemists are biologists.

Conclusions:

I. No biologists are physicists.

II. Some biologists are physicists.

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

Q77. If '+' and '×' are interchanged, and '–' and '÷' are interchanged, then what will come in place of the question mark in the following equation?

21 ÷ 57 – 3 × 8 + 4 = ?

(a) 56
(b) 23
(c) 45
(d) 34

Q78. In a certain code language, 'MADE' is coded as '4172' and 'HAME' is coded as '2475'. What is the code for 'H' in the given code language?

(a) 7
(b) 4
(c) 5
(d) 2

Q79. What should come in place of the question mark (?) in the given series?

27 35 51 75 107 ?

(a) 125
(b) 147

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(c) 148
(d) 174

Q80. In a certain code language, ‘ALPS’ is coded as ‘3257’ and ‘PUNE’ is coded as ‘1346’. What is the code for ‘P’ in the given code language?
(a) 1
(b) 5
(c) 7
(d) 3

Q81. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only. (Note: all numbers are single digit numbers only.)
(Left) 1 & 9 6 > 7 5 * 7 + 5 ^ 7 0 * 4 % $ (Right)
How many such symbols are there, each of which is immediately preceded by a number and also immediately followed by a number?
(a) Nine
(b) Six
(c) Eight
(d) Seven

Q82. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only three boxes are kept above A. Only one box is kept between F and A. Only three boxes are kept between F and E. E is kept at some place above A. B is kept immediately below E. G is kept at one of the places above D. C is not kept immediately above or below F. How many boxes are kept above B?
(a) 4
(b) 1
(c) 3
(d) 2

Q83. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?
LDH 14, NFJ 17, PHL 20, RJN 23, ?
(a) TLP 26
(b) RTS 26
(c) RTQ 27
(d) TMQ 27

Q84. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)
(a) MP-GK
(b) PS-JM
(c) JM-DH
(d) TW-NR

Q85. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?
LIF 13, DAX 24, VSP 46, NKH 90, FCZ 178, ?
(a) XUR 351
(b) XUR 354
(c) XUM 354
(d) UUR 354

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Q86. This question is based on the five, three-digit numbers given below.

(Left) 267 513 671 895 729 (Right)

(Example: 697 – First digit = 6, second digit = 9 and third digit = 7) (NOTE: All operations to be done from left to right.)

If the digits of each number are added and their respective resultants are arranged in the ascending order, what is the number placed 4th from the right end?

(a) 18
(b) 15
(c) 14
(d) 9

Q87. RUTW is related to TWVY in a certain way based on the English alphabetical order. In the same way, MPOR is related to ORQT. To which of the given options is VYXA related, following the same logic?

(a) XAZC
(b) XZYC
(c) XBYE
(d) XAYC

Q88. Shyam starts from Point A and drives 12 km towards east. He then takes a right turn, drives 7 km, turns right and drives 5 km. He then takes a left turn and drives 9 km. He takes a final right turn, drives 7 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) 19 km towards east
(b) 16 km towards north
(c) 19 km towards north
(d) 16 km towards south

Q89. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only two boxes are kept between G and A. Only F is kept above B. No box is kept below A. E is kept at some place below C but at some place above D. How many boxes are kept between D and F?

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

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

ACF : CEH :: PET : RGV

(a) XVN : ZXP
(b) WDX : ZFY
(c) QTP : SUW
(d) SAD : TBO

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.

HIVE - EHVI - HEIV

FANG - GFNA - FGAN

(a) SORT - TSOR - ORTS
(b) MUSK - KMSU - MKUS
(c) TENS - ETNS - SENT
(d) RAIN - NRIA - RANI

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Q92. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

Some birds are animals.

All animals are tables.

Conclusions:

(I): Some birds are tables.

(II): All tables are animals.

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

Q93. 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) LHK
(b) OKM
(c) UQT
(d) RNQ

Q94. What should come in place of the question mark (?) in the given series? 36 51 45 64 54 77 63 90 72 ?

(a) 110
(b) 113
(c) 103
(d) 106

Q95. Babar starts from Point A and drives 14 km towards West. He then takes a left turn, drives 7 km, turns right and drives 9 km. He then takes a right turn and drives 7 km. He takes a final right turn, drives 5 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) 20 km towards West
(b) 18 km towards East
(c) 18 km towards West
(d) 20 km towards North

Q96. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) SO−ON
(b) AW−XT
(c) PL−MI
(d) TP−QM

Q97. What should come in place of the question mark (?) in the given series?

102 108 120 138 162 ?

(a) 204
(b) 212
(c) 230
(d) 192

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Q98. Seven boxes F, G, H, I, K, L and O are kept one over the other but not necessarily in the same order.

O is kept second from the bottom. Only three boxes are kept between O and G. L is kept at one of the positions below O. Only I is kept between G and H. F is kept at one of the positions above G.

How many boxes are kept between L and F?

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

Q99. J, K, L, M, N, O and S are sitting around a circular table, facing the centre of the table. Only three people sit between O and J when counted from the left of O. Only three people sit between K and M when counted from the right of M. S sits to the immediate right of K. N is an immediate neighbour of M as well as J. Who sits second to the left of L?

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

Q100. In the following number-pairs, the second number is obtained by applying certain mathematical operation(s) to the first number. Select the number-pair in which the numbers are related in the same way as are the numbers of the following pairs. (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.)

227, 112

240, 125

(a) 210, 85
(b) 254, 129
(c) 262, 147
(d) 215, 110

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) the President of India

The correct answer is the President of India.

Key Points

• Under Article 239 of the Constitution of India, Union Territories are administered by the President of India through an administrator appointed by him/her.

• The President appoints an administrator or Lieutenant Governor for each Union Territory, who acts as the executive head of the

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Union Territory.

• The President of India has the ultimate authority over Union Territories, making administrative decisions and delegating powers to the appointed administrators.

• Union Territories are governed directly by the Central Government unlike states which have their own elected governments. This ensures a centralized form of administration.

• Examples: Union Territories like Delhi, Puducherry, and Jammu & Kashmir have a special status with elected legislative assemblies, but their administrators still report to the President of India.

Additional Information

• Union Territories of India:

• India currently has 8 Union Territories, including Delhi, Puducherry, Chandigarh, Andaman and Nicobar Islands, Lakshadweep, Dadra and Nagar Haveli and Daman and Diu, Ladakh, and Jammu & Kashmir.

• They are directly governed by the Central Government, unlike states which have their own governments.

• Some Union Territories, like Delhi and Puducherry, have legislative assemblies but their powers are limited compared to states.

• Role of Administrator/Lieutenant Governor:

• Administrators or Lieutenant Governors act as the representatives of the President of India in Union Territories.

• They oversee the administration, law enforcement, and implementation of policies directly from the Union Government.

• In Union Territories with legislative assemblies, the administrator/Lieutenant Governor acts in coordination with the elected government but retains significant powers.

• Article 239:

• Article 239 provides the constitutional framework for the governance of Union Territories.

• The President may appoint an administrator for Union Territories or delegate certain powers to the administrator for efficient administration.

• The administrator functions under the President's direct supervision and guidance.

• Special Status Union Territories:

• Union Territories like Delhi and Puducherry have legislative assemblies, allowing them to make laws on certain subjects.

• However, the administrator/Lieutenant Governor plays a critical role as they act on behalf of the President and can override decisions in specific circumstances.

• The governance of these Union Territories is a unique blend of centralized and decentralized administration.

Important Points

• Union Territories without Legislative Assemblies:

• Union Territories like Chandigarh, Lakshadweep, and Andaman and Nicobar Islands are governed entirely by administrators appointed by the President without any legislative assembly.

• Their policies and administration are directly influenced by the Central Government.

• Role of Central Government:

• The Union Territories are supervised and funded by the Union Government, ensuring uniform administration across the country.

• They are often used as strategic locations for governance, security, and development purposes.

• Governance Framework:

• The governance of Union Territories follows a centralized approach but ensures flexibility for those with legislative assemblies like Delhi and Puducherry.

• This framework allows the President to maintain control while delegating administrative powers to local representatives.

• Historical Context:

• Union Territories were created to ensure efficient governance of regions that were either too small to be states or had strategic importance.

• Examples include Chandigarh, a planned city serving as the capital of two states (Punjab and Haryana).

Q2. Answer: (c) The Union Public Service Commission

The correct answer is The Union Public Service Commission.

Key Points

• The Union Public Service Commission (UPSC) is India's premier central recruiting agency responsible for conducting examinations to select civil servants based on merit.

• Established under Article 315 of the Constitution of India, the UPSC is an autonomous body that ensures impartial recruitment of candidates to the civil services.

• The UPSC conducts various exams such as the Civil Services Examination (CSE), which selects candidates for prestigious services like the IAS, IPS, IFS, and others.

• The Commission functions independently and is protected under the Constitution to ensure that its operations remain unbiased and free from political influence.

• The headquarters of the UPSC is located at Dholpur House, New Delhi, and it plays a critical role in recruiting candidates for various posts under the Central Government.

• The recruitment process includes preliminary exams, mains exams, and a personal interview to ensure that the candidates meet the high standards required for civil services in India.

Additional Information

• UPSC Constitutional Provisions:

• The UPSC is governed by Articles 315 to 323 of the Indian Constitution, which outline the structure, functions, and independence of the Commission.

• The Commission consists of a Chairman and other members appointed by the President of India.

• The term of office for UPSC members is six years or until the age of 65 years, whichever is earlier.

• Functions of UPSC:

• Conducting examinations for appointments to the civil services of the Union, including the Indian Administrative Service (IAS), Indian Police Service (IPS), and Indian Foreign Service (IFS).

• Advising the President and Governors on matters related to recruitment, transfers, promotions, and disciplinary actions of civil servants.

• Ensuring fair and transparent recruitment processes for various Group A and Group B posts under the Central Government.

• Historical Background:

• The UPSC traces its origins to the Public Service Commission established in 1926 under British rule.

• Post-independence, the Commission was reconstituted as the Union Public Service Commission in 1950, following the adoption of the Indian Constitution.

• Examinations Conducted:

• Some of the major exams conducted by UPSC include the Civil Services Examination (CSE), Indian Engineering Services (IES), Indian Forest Services (IFoS), Combined Defense Services (CDS), and more.

• The exams are highly competitive, with lakhs of candidates appearing every year for a limited number of posts.

• Significance of UPSC:

• UPSC ensures merit-based selection, promoting efficiency and integrity in the governance of the country.

• It plays a pivotal role in strengthening the administrative structure of India by recruiting highly qualified and competent individuals.

Important Points

• UPSC vs State Public Service Commissions:

• While UPSC handles recruitment for central civil services, State Public Service Commissions (SPSC) conduct exams for state-level administrative posts.

• Both are independent constitutional bodies, but their jurisdiction differs based on the level of governance.

• Autonomy and Accountability:

• The independence of UPSC is safeguarded to ensure unbiased recruitment, but it remains accountable to the Parliament and the President of India.

• The Commission submits an annual report to the President, detailing its activities and recommendations.

• UPSC Examination Process:

• The Civil Services Examination consists of three stages: Prelims, Mains, and Interview.

• Preliminary exams test general knowledge and aptitude, while the mains focus on specialized subjects. The interview assesses personality and decision-making capabilities.

Q3. Answer: (d) Tidal energy

The correct answer is Tidal energy.

Key Points

• Tidal energy is a form of renewable energy that is generated by the movement of tides. It is directly influenced by the gravitational pull of the moon and the sun on Earth's water bodies.

• The gravitational forces between the Earth and the moon create periodic rise and fall in sea levels, known as tides. These tidal movements are harnessed to generate electricity using tidal energy technologies.

• Tidal energy systems typically use tidal barrages, tidal fences, or tidal turbines to capture the kinetic and potential energy of moving water caused by tides.

• Unlike solar and wind energy, tidal energy is highly predictable and consistent, as tides follow a natural and regular cycle due to celestial mechanics.

• The implementation of tidal energy systems is most feasible in areas with a high tidal range or strong tidal currents, such as estuaries and coastal regions with significant differences between high and low tides.

Additional Information

• Wind energy:

• Generated using wind turbines that convert the kinetic energy of wind into electrical energy.

• Unlike tidal energy, wind energy is dependent on atmospheric conditions and wind patterns.

• Wind energy is intermittent as it relies on the availability of wind, which can vary significantly.

• Biomass energy:

• Derived from organic materials such as wood, agricultural residues, and animal waste.

• It is produced by burning biomass or converting it into biofuels, such as ethanol or biodiesel.

• Unlike tidal energy, it is not directly influenced by celestial gravitational forces.

• Solar energy:

• Harvested using photovoltaic cells that convert sunlight into electricity.

• It is dependent on the availability of sunlight, making it intermittent in nature.

• Solar energy is not connected to the gravitational pull of the moon.

• Examples of tidal energy plants:

• The La Rance Tidal Power Station in France is one of the oldest and largest tidal power plants in the world.

• The Sihwa Lake Tidal Power Station in South Korea is another significant facility that generates tidal energy.

• Environmental Impact: Tidal energy systems can influence local ecosystems, especially if tidal barrages alter water flow, salinity, or sedimentation patterns. However, they emit no greenhouse gases during operation, making them environmentally cleaner compared to fossil fuels.

Important Points

• Tidal Range: The difference in height between high and low tides is referred to as the tidal range. Locations with a high tidal range are more suitable for tidal power generation.

• Cost and Challenges: Tidal energy systems have high initial installation costs, and their construction can face geographical and environmental challenges.

• Global Potential: According to estimates, the global potential of tidal energy is significant, with regions such as the Bay of Fundy in Canada and the Severn Estuary in the UK being prime sites.

• Advantages: Tidal energy is renewable, predictable, and environmentally friendly with low greenhouse gas emissions.

• Future Prospects: Technological advancements in tidal energy systems are expected to improve efficiency and reduce costs, making it a more viable option for clean energy generation in the future.

Q4. Answer: (a) Zorawar

The correct answer is Zorawar.

Key Points

• Zorawar is India's indigenous light tank designed to operate in extreme conditions, including high-altitude regions such as Ladakh at an altitude of over 4200 m.

• In December 2024, Zorawar achieved a significant milestone by successfully firing multiple rounds at various ranges in high-altitude terrains, showcasing its operational capabilities.

• The tank is specifically developed to counter challenges posed by adversaries in mountainous and rugged terrains, particularly along the borders with China and Pakistan.

• Its lightweight design enables easy maneuverability in difficult terrains where heavy tanks face operational limitations.

• The Zorawar light tank is equipped with advanced weaponry, surveillance equipment, and modern communication systems to cater to the operational needs in high-altitude battlefields.

Additional Information

• Light Tanks:

• Light tanks are designed for rapid mobility and operational efficiency in terrains unsuitable for heavy tanks, such as mountainous regions or marshy areas.

• They are equipped with anti-tank capabilities, advanced targeting systems, and lightweight armor to balance mobility and protection.

• Development of Zorawar:

• Zorawar is named after General Zorawar Singh, a military commander known for his campaigns in Ladakh and Tibet.

• The tank was developed as a part of India's defense modernization program to address challenges in high-altitude areas.

• It incorporates advanced technologies such as AI-driven systems and enhanced situational awareness tools to ensure

operational efficiency.

• Comparison with Heavy Tanks:

• Heavy tanks like India's T-90 are designed for flat terrains and open battlefields, whereas light tanks like Zorawar are suited for rapid deployment in rugged terrains.

• Light tanks emphasize mobility and adaptability, whereas heavy tanks focus on firepower and armor.

• Strategic Importance:

• India's border areas, especially in the Himalayas, require specialized equipment to counter threats effectively. Zorawar is a strategic asset in such regions.

• The light tank enhances India's defense posture and ensures readiness against potential threats in high-altitude areas.

Important Points

• Development Agency: Zorawar is developed by the Defence Research and Development Organisation (DRDO) in collaboration with domestic defense manufacturers.

• Future Deployment: The tank is expected to be deployed in strategically important regions like Ladakh and Arunachal Pradesh to reinforce India's defense capabilities.

• Global Trends: Many countries, including the US and China, have focused on developing light tanks for specialized operations in challenging terrains.

Q5. Answer: (d) Animal husbandry, fishery, horticulture and rural industries

The correct answer is Animal husbandry, fishery, horticulture and rural industries.

Key Points

• The Eighth Five-Year Plan (1992–1997) of India emphasized employment generation through the development of certain sectors that could absorb large labor forces and provide sustainable livelihoods.

• Animal husbandry was one of the key sectors highlighted, as it involved rural populations and offered opportunities for self-employment, income generation, and poverty alleviation.

• Fisheries were another focus area, considering India’s extensive coastline and inland water resources, which have the potential for providing employment and improving food security.

• Horticulture was promoted to boost agricultural diversification, improve rural livelihoods, and enhance income generation for small and marginal farmers.

• Rural industries, including small and medium enterprises, were supported to create jobs and spur economic activities in rural areas.

• These sectors were selected due to their labor-intensive nature, which aligned with the government's objective to address unemployment and improve rural livelihoods.

Additional Information

• The Eighth Five-Year Plan:

• The Eighth Five-Year Plan covered the period from 1992 to 1997. It was launched after a two-year break post the Seventh Plan due to political instability.

• The plan aimed at achieving an average annual growth rate of 5.6%, which was achieved due to the liberalization of the economy and structural adjustments.

• It focused on employment generation, poverty alleviation, and economic stability, along with modernization of industries and increased self-reliance.

• Animal Husbandry:

• Animal husbandry contributes significantly to India’s agriculture GDP and provides supplementary income to farmers.

• It involves activities like dairy farming, poultry farming, goat rearing, and other livestock rearing activities.

• India is the largest producer of milk, and the sector provides employment to millions in rural areas.

• Fisheries:

• India has a coastline of about 8,000 km and abundant inland water resources.

• The fisheries sector provides livelihoods to over 14 million people and significantly contributes to India’s export earnings.

• It includes marine fisheries, inland fisheries, and aquaculture.

• Horticulture:

• Horticulture includes the cultivation of fruits, vegetables, flowers, medicinal plants, and spices.

• It is a major source of employment in rural areas, particularly for women and small farmers.

• India is one of the largest producers of fruits and vegetables globally, including mangoes, bananas, and guavas.

• Rural Industries:

• Rural industries include small-scale and cottage industries, such as handicrafts, textiles, and food processing.

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• These industries play a crucial role in providing employment and reducing rural-to-urban migration.

• They also help in preserving India’s rich cultural heritage and traditional skills.

Important Points

• The Eighth Plan was the first to recognize the importance of human development as a central goal of planning.

• It marked a shift from a centralized planning model to a market-oriented economy.

• Focus was also given to education, healthcare, and infrastructure development for holistic growth.

• The plan coincided with India’s economic liberalization in 1991, which led to policy changes such as reduction of import tariffs and deregulation of markets.

Q6. Answer: (a) Tanzania

The correct answer is Tanzania.

Key Points

• AIKEYME is India's first major naval exercise in Africa, aimed at strengthening maritime collaboration and security.

• The inaugural edition of AIKEYME was held off the coast of Tanzania in April 2025, marking a significant milestone in India's naval outreach to Africa.

• Tanzania's strategic location along the Indian Ocean makes it a crucial partner for India in enhancing maritime security and fostering bilateral relations.

• The naval exercise focused on combating piracy, illegal trade, and maritime threats, ensuring the safety of international sea lanes.

• The initiative is part of India's broader strategy to establish a stronger presence in the Indian Ocean Region (IOR) and engage with African nations.

Additional Information

• Tanzania:

• Tanzania is located in East Africa and bordered by the Indian Ocean to the east.

• Its capital is Dodoma, while its largest city and port is Dar es Salaam, which plays a pivotal role in regional maritime trade.

• Tanzania has a coastline stretching over 1,424 kilometers, making it a key player in maritime security in the region.

• It is a member of regional organizations such as the East African Community (EAC) and the Indian Ocean Rim Association (IORA).

• India-Africa Maritime Relations:

• India has been actively engaging with African nations to enhance maritime cooperation under initiatives like SAGAR (Security and Growth for All in the Region).

• India aims to build capacity and strengthen the maritime infrastructure of African nations to ensure regional stability.

• Joint naval exercises like AIKEYME provide a platform for sharing expertise, improving interoperability, and addressing mutual challenges such as piracy and illegal fishing.

• Indian Ocean Region (IOR):

• The IOR is strategically vital for global trade, with approximately 80% of global oil trade passing through its sea lanes.

• India has a vested interest in maintaining peace and security in the region, given its dependency on maritime trade.

• Through bilateral and multilateral efforts, India collaborates with countries like Tanzania to secure the IOR against threats like terrorism and trafficking.

• Importance of Naval Exercises:

• Naval exercises enhance the operational capabilities of participating nations and foster mutual trust.

• They provide opportunities for joint training, sharing best practices, and improving response mechanisms to maritime threats.

• Such initiatives highlight India's commitment to international collaboration and its role as a responsible global player in maritime security.

Important Points

• Strategic Significance of Tanzania:

• Tanzania's location along the Indian Ocean places it at the crossroads of major shipping routes, connecting Africa, Asia, and Europe.

• Its proximity to key maritime chokepoints like the Mozambique Channel underscores its importance in regional security dynamics.

• India has been providing support to Tanzania in areas like defense training, capacity building, and infrastructure development to enhance its maritime capabilities.

• AIKEYME Initiative:

• AIKEYME signifies India's proactive approach to building partnerships with African nations in the maritime domain.

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• The exercise is expected to expand in scope and participation, involving more countries and addressing diverse maritime challenges.

• It serves as a stepping stone for deeper engagement between India and Africa in areas like trade, security, and sustainable development.

• Global Maritime Security:

• Maritime security is critical for ensuring the safety of sea lanes, which are vital for global commerce and energy supply.

• Collaborative efforts among nations can mitigate risks associated with piracy, smuggling, and geopolitical tensions in maritime regions.

• India's leadership in maritime initiatives reflects its commitment to fostering peace, stability, and prosperity in the Indo-Pacific and beyond.

Q7. Answer: (c) Paris

The correct answer is Paris.

Key Points

• The French Open, also known as Roland Garros, is one of the four Grand Slam tennis tournaments and is held annually in Paris, France.

• The tournament is conducted at the Stade Roland Garros, a tennis venue named after the French aviator Roland Garros, located in Paris.

• It is the premier clay court tennis championship in the world and is renowned for its challenging surface and prestigious status in professional tennis.

• The French Open usually takes place during late May and early June every year, attracting players and spectators from across the globe.

• Paris has been the host city of the French Open since its inception in 1891, making it an integral part of the city's rich sporting and cultural history.

Additional Information

• Grand Slam Tournaments:

• The Grand Slam tournaments include the Australian Open, French Open, Wimbledon, and the US Open.

• The French Open is distinct for being the only Grand Slam played on clay courts.

• It is considered one of the most physically demanding tournaments due to the slow and high-bouncing clay surface.

• Winning the French Open is a major achievement in tennis, and many legends like Rafael Nadal, Chris Evert, and Steffi Graf have excelled on its courts.

• Stade Roland Garros:

• Located in the 16th arrondissement of Paris, Stade Roland Garros is the venue for the French Open.

• It includes multiple courts, with Court Philippe Chatrier being the main stadium where key matches, including finals, are played.

• In recent years, the stadium has undergone renovations, including the addition of a retractable roof on Court Philippe Chatrier.

• Clay Courts:

• Clay courts are made of crushed brick, shale, or stone and provide a slower playing surface compared to grass or hard courts.

• Players need exceptional stamina, patience, and skill to excel on clay.

• Rafael Nadal is widely known as the "King of Clay", having won the French Open a record number of times.

• Paris as a Sporting Hub:

• Paris is a global city known for hosting major international sports events, including the Summer Olympics (1900, 1924, and upcoming in 2024).

• It is also home to top-tier football clubs like Paris Saint-Germain (PSG) and historic venues such as the Stade de France.

• The city’s blend of history, culture, and sports makes it a favorite destination for tourists and sports enthusiasts.

Important Points

• Historical Significance:

• The French Open began as a national tournament in 1891 and became an international event in 1925.

• It is named after Roland Garros, a pioneer aviator and war hero, reflecting the French tradition of honoring national figures.

• The tournament has grown into one of the most prestigious events in tennis, with millions of viewers worldwide.

• Tourism in Paris:

• The French Open attracts thousands of visitors annually, boosting tourism and the local economy in Paris.

• Fans often combine the tournament with visits to iconic Parisian landmarks such as the Eiffel Tower, Louvre Museum, and Notre-Dame Cathedral.

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Q8. Answer: (a) Nafithromycin

The correct answer is Nafithromycin.

Key Points

• Nafithromycin is India's first indigenous macrolide antibiotic developed for treating community-acquired pneumonia (CAP).

• The drug was highlighted in a December 2024 PIB factsheet, showcasing its importance in addressing respiratory tract infections.

• Community-acquired pneumonia is a common infectious disease caused by bacteria, viruses, or fungi, and Nafithromycin demonstrates potent activity against bacterial pathogens responsible for CAP.

• Nafithromycin belongs to the macrolide class of antibiotics, which are effective in targeting bacterial infections by inhibiting protein synthesis in pathogens.

• This development marks a significant milestone in India's pharmaceutical industry, showcasing research and development capabilities in antibiotic innovation.

Additional Information

• Macrolide Antibiotics:

• Macrolides are a class of antibiotics that inhibit bacterial protein synthesis by binding to the 50S ribosomal subunit.

• They are commonly used to treat respiratory tract infections, skin infections, and sexually transmitted diseases.

• Examples include erythromycin, azithromycin, and clarithromycin.

• Community-Acquired Pneumonia (CAP):

• CAP is an infection of the lungs acquired outside of healthcare settings.

• It is commonly caused by pathogens such as Streptococcus pneumoniae, Haemophilus influenzae, and atypical bacteria like Mycoplasma pneumoniae.

• Symptoms include cough, fever, chest pain, and difficulty breathing.

• Treatment typically involves antibiotics, and Nafithromycin provides a targeted solution for bacterial CAP.

• Other Antibiotics in the Options:

• Pretomanid: An antibiotic used for the treatment of multidrug-resistant tuberculosis.

• Lefamulin: Approved for treating community-acquired bacterial pneumonia, but it is not indigenous to India.

• Delafloxacin: A fluoroquinolone antibiotic used for acute bacterial skin infections and CAP, but it is developed internationally.

• India's Pharmaceutical Advancement:

• India is globally recognized as a hub for generic medicine production and is now making strides in developing novel drugs.

• The development of Nafithromycin signifies India's commitment to strengthening its healthcare infrastructure and promoting local innovation.

Important Points

• Role of Indigenous Antibiotics:

• Indigenous antibiotics like Nafithromycin reduce dependency on imported medicines and foster self-reliance in healthcare.

• They help address antimicrobial resistance by introducing novel mechanisms of action.

• Antibiotic Resistance:

• Antibiotic resistance is a major global health concern caused by overuse or misuse of antibiotics.

• New antibiotics, like Nafithromycin, are crucial in combating resistant bacterial strains.

• Global initiatives such as the WHO's Global Action Plan on Antimicrobial Resistance aim to tackle this challenge.

Q9. Answer: (c) Lawyer-Judges

The correct answer is Lawyer-Judges.

Key Points

• The Voharikas were a class of judicial officers during the Magadha period, who acted as lawyer-judges. They were responsible for resolving legal disputes and administering justice.

• They were well-versed in the legal codes and laws of the time and interpreted them to deliver fair judgments.

• The term "Voharika" is derived from the word "Vyavahara," which refers to legal matters, lawsuits, or disputes, indicating their primary role in judicial proceedings.

• They were part of the broader judicial system of ancient India, which included various levels of courts ranging from local village assemblies to royal courts.

• The presence of the Voharikas highlights the structured and organized judicial framework that existed during the Magadha period, emphasizing the emphasis on law and order in ancient India.

Additional Information

• The Judicial System in Ancient India:

• Ancient India had a well-developed judicial system, with a focus on Dharma (righteousness and law).
• Legal disputes were resolved at various levels, including village assemblies (Sabhas), guild courts, and royal courts.
• The king was considered the ultimate authority in judicial matters, assisted by ministers and advisors.
• Categories of Judicial Officers:
• The Voharikas were part of a larger system of judicial functionaries, including Pradeshtris (investigators), Amatyas (ministers), and Rajukas (revenue officers who also acted as judges).
• Each officer had a specific role, ensuring that the judicial process was efficient and fair.
• Role of Dharma Shastras:
• The Dharma Shastras served as the legal and ethical codes, guiding the decisions of judicial officers like the Voharikas.
• They covered various aspects of civil, criminal, and family law, ensuring a comprehensive legal framework.
• Judicial Principles during the Magadha Period:
• Justice was based on principles of fairness, equity, and adherence to Dharma.
• Witnesses and evidence played a crucial role in judicial proceedings.
• Punishments were often proportional to the severity of the crime, reflecting a sense of justice and deterrence.

Important Points

• Option 1 - Local Tax Collectors:
• This refers to officials responsible for collecting revenue and taxes, often known as Karshakas or other regional terms.
• They had no role in judicial matters, making this option incorrect.
• Option 2 - Judges in Village Assemblies:
• Village assemblies (Sabhas) often resolved disputes at the local level, but the Voharikas operated at a more formal judicial level, making this option incorrect.
• Option 4 - Military Generals:
• Military generals were responsible for leading armies and maintaining defense, not for judicial functions, making this option incorrect.

Q10. Answer: (c) Ministry of Civil Aviation

The correct answer is Ministry of Civil Aviation.

Key Points

• Kinjarapu Ram Mohan Naidu was recognized in the World Economic Forum (WEF) Young Global Leaders list of 2025, highlighting his leadership qualities and contributions. This recognition is a prestigious honor.
• During May 2025, he was associated with the Ministry of Civil Aviation, which oversees the aviation sector in India, including the development, regulation, and promotion of airport infrastructure and air services.
• The Ministry of Civil Aviation is crucial for ensuring efficient air transport services, promoting safe and affordable air travel, and enhancing the connectivity across the nation and globally.
• Kinjarapu Ram Mohan Naidu's work in the Ministry likely involved contributions toward the modernization of the aviation sector, including innovations in airport infrastructure, policies for regional connectivity, and sustainable aviation practices.
• The recognition in the WEF Young Global Leaders list is given to individuals under the age of 40 who have shown exemplary leadership and have potential to influence positive change globally. This validates his significant contributions in his ministerial role.

Additional Information

• World Economic Forum (WEF) Young Global Leaders:
• Established in 2004, the WEF Young Global Leaders initiative recognizes exceptional leaders under the age of 40 from various sectors, including politics, business, arts, and academia.
• These individuals are selected for their ability to shape the future through visionary ideas and efforts to address global challenges.
• The initiative aims to create a platform for collaboration and innovation among young leaders globally.
• Ministry of Civil Aviation:
• This ministry is responsible for the formulation of national aviation policies and regulations in India.
• It oversees airports, airlines, air traffic management, and passenger safety.
• Prominent schemes under this ministry include the UDAN (Ude Desh ka Aam Naagrik), aimed at enhancing regional connectivity and making air travel affordable to common citizens.
• The ministry has been instrumental in driving growth in India’s aviation sector, which is one of the fastest-growing markets globally.
• Achievements of Kinjarapu Ram Mohan Naidu:

• He is known for his contributions to public service and for representing the interests of his constituency effectively.

• His inclusion in the WEF Young Global Leaders list highlights his potential to influence policies and create sustainable development in India.

• Role of Young Leaders in Global Development:

• Young leaders play a pivotal role in bringing innovative solutions to pressing global issues, such as climate change, economic growth, and digital transformation.

• They contribute to shaping government policies and corporate strategies for sustainable development.

• Recognition platforms like the WEF Young Global Leaders encourage collaboration and exchange of ideas among emerging leaders.

Important Points

• UDAN Scheme:

• Launched in 2017, the UDAN scheme aims to make air travel accessible and affordable by connecting underserved and remote regions.

• It provides financial incentives to airlines for operating regional routes and ensures the development of regional airports.

• Under the scheme, airfares for short-distance flights are capped to ensure affordability.

• India's Civil Aviation Growth:

• India is projected to become the third-largest aviation market globally by 2024.

• The sector has witnessed significant growth due to increased domestic and international connectivity and enhanced airport infrastructure.

• Government initiatives and policies have played a crucial role in driving growth and ensuring passenger safety.

Q11. Answer: (b) Settings > Personalization

The correct answer is Settings > Personalization.

Key Points

• To change the desktop wallpaper in a Windows operating system, users need to navigate to the Settings menu. Within this menu, the specific option to customize the wallpaper is found under Personalization.

• The Settings > Personalization option provides access to themes, background settings, color customization, and lock screen preferences.

• Within the Personalization menu, users can choose from various options such as a picture, solid color, or slideshow to set as the desktop wallpaper.

• Other options in the Personalization menu include customizing themes, fonts, and the start menu, but changing the wallpaper is one of the most common actions available here.

• Thus, selecting Settings > Personalization is the correct procedure to change the desktop wallpaper.

Additional Information

• Settings > Devices:

• This option is used to manage connected devices, such as printers, Bluetooth devices, and other peripherals.

• It does not provide customization options for wallpapers or themes.

• Settings > Ease of Access:

• This section is focused on accessibility settings for users with disabilities or special requirements.

• It allows adjustments such as text-to-speech, magnifier settings, high contrast mode, and captions but is unrelated to wallpaper customization.

• Settings > Apps:

• The Apps section allows users to manage installed applications, set default apps, and configure app permissions.

• It does not provide any settings for changing the desktop wallpaper.

• Personalization Options:

• Under Personalization, users can change the background image or color by selecting the "Background" tab.

• There is also an option to use a slideshow that rotates through selected photos as the desktop wallpaper.

• Furthermore, users can customize the theme, which includes settings for background, colors, and sounds.

Important Points

• Steps to Change the Desktop Wallpaper in Windows:

• Right-click on the desktop and select Personalize.

• Alternatively, open the Settings app using the Start menu or by pressing Win + I.

• Navigate to Settings > Personalization > Background.

• In the Background section, choose one of the following: Picture, Solid Color, or Slideshow.

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• Browse and select the desired image or color, and it will be applied as your desktop wallpaper.

Q12. Answer: (b) 1952

The correct answer is 1952.

Key Points

• The Hershey-Chase experiment was conducted in 1952 by Alfred Hershey and Martha Chase, providing conclusive evidence that DNA is the genetic material, not proteins.

• They worked with bacteriophages (viruses that infect bacteria) to determine whether DNA or protein carried genetic information.

• The experiment involved labeling DNA with radioactive phosphorus (P-32) and proteins with radioactive sulfur (S-35) to trace their presence after infection of bacterial cells.

• After the infection process and separation using a blender, it was observed that radioactive DNA entered the bacterial cells, whereas radioactive protein remained outside the cells.

• This demonstrated that DNA, not protein, is responsible for carrying genetic information, revolutionizing molecular biology and genetics.

Additional Information

• Background of the Hershey-Chase Experiment:

• During the early 20th century, scientists debated whether DNA or proteins were the genetic material.

• Proteins were initially thought to be the genetic material due to their complex structure and diverse functions, while DNA was considered too simple.

• The Hershey-Chase experiment resolved this debate by proving that DNA, not proteins, directs the synthesis of new viruses in infected cells.

• Bacteriophages:

• Bacteriophages are viruses that infect bacteria and consist of a protein coat surrounding their DNA core.

• Hershey and Chase used the bacteriophage T2 in their experiment.

• When bacteriophages infect bacteria, they inject their genetic material (DNA) into the bacterial cell, leaving the protein coat outside.

• Radioactive Isotopes Used:

• Hershey and Chase used radioactive phosphorus (P-32) to label DNA and radioactive sulfur (S-35) to label proteins.

• Phosphorus is present in DNA but not in proteins, whereas sulfur is present in proteins but not in DNA.

• This allowed them to distinguish between DNA and proteins during their study.

• Impact of the Hershey-Chase Experiment:

• The discovery that DNA is the genetic material laid the foundation for the modern field of molecular biology.

• It inspired future research, including the discovery of the double-helix structure of DNA by Watson and Crick in 1953.

• This experiment also supported the findings of Avery, MacLeod, and McCarty (1944), who had earlier suggested that DNA is the genetic material.

Important Points

• Alfred Hershey:

• He was an American bacteriologist and geneticist who received the Nobel Prize in Physiology or Medicine in 1969 for his work on genetic structures.

• His research contributed significantly to understanding viral replication and the role of DNA in heredity.

• Martha Chase:

• She was an American geneticist who worked closely with Hershey during the experiment.

• Chase's contribution to the experiment was critical in demonstrating the role of DNA.

• Significance of 1952:

• The year 1952 marked a turning point in biology, as the Hershey-Chase experiment conclusively proved that DNA is the hereditary material.

• This discovery paved the way for future breakthroughs in genetics and biotechnology.

Q13. Answer: (b) 58^(th)

The correct answer is 58th.

Key Points

• The Jnanpith Award is one of the highest literary honors in India, awarded annually by the Bharatiya Jnanpith organization to an author for their outstanding contribution to literature.

• The 58th Jnanpith Award was conferred upon Jagadguru Rambhadracharya, a renowned Sanskrit scholar, in May 2025. This

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indicates his exceptional literary contributions in the Sanskrit language.

• Jagadguru Rambhadracharya is widely recognized for his profound knowledge in the Sanskrit language, and his works are celebrated for their depth and richness.

• The award ceremony was presided over by Droupadi Murmu, the President of India, showcasing the significance of this prestigious event.

• The Jnanpith Award has been presented annually since its inception in 1961. It honors literary figures across all recognized languages in India as per the Eighth Schedule of the Indian Constitution.

Additional Information

• Jnanpith Award:

• The award was instituted in 1961 by the Bharatiya Jnanpith organization.

• It recognizes authors who write in any of the 22 languages listed in the Eighth Schedule of the Indian Constitution.

• The award consists of a cash prize, a citation, and a bronze replica of Saraswati, the goddess of knowledge.

• Prominent recipients include G. Sankara Kurup, the first awardee, and other literary stalwarts like Raghuvir Sahay, Amrita Pritam, and Shankha Ghosh.

• Jagadguru Rambhadracharya:

• He is a prolific scholar and writer, known for his significant contributions to Sanskrit literature.

• He is also recognized as a spiritual leader and holds the title of Jagadguru.

• Rambhadracharya is known for his work in translating and interpreting Hindu scriptures and for his poetry, essays, and literary compositions.

• His contributions have elevated the status of Sanskrit literature in contemporary times.

• Droupadi Murmu:

• She is the 15th President of India and the first tribal woman to hold the office.

• Her presidency is marked by a focus on inclusivity and the recognition of India's diverse cultural and literary heritage.

• Presiding over the award ceremony highlights her role in promoting Indian literature and culture.

• Significance of the Jnanpith Award:

• The award is a recognition of excellence in Indian literature, celebrating authors whose works contribute to the nation’s literary legacy.

• It underscores the importance of preserving and promoting literary works in India's diverse languages.

• The award has evolved over the years to include works in modern and classical literature.

Important Points

• Selection Process:

• The recipient of the Jnanpith Award is chosen by a panel of scholars and experts in literature.

• It involves a rigorous process to ensure that the awardee has made a substantial contribution to their respective language and literature.

• Languages Covered:

• Initially, the award was only given for works in Hindi, but it later expanded to include all recognized languages under the Eighth Schedule.

• This inclusivity has helped promote literature across various regions in India.

• Historical Context:

• The Jnanpith Award has played a pivotal role in encouraging authors to contribute to India's rich literary heritage.

• It has helped preserve classical and modern works, ensuring their relevance to future generations.

Q14. Answer: (a) 25m

The correct answer is 25m.

Key Points

• Simranpreet Kaur Brar is a noted Indian shooter who has represented India in various international shooting events.

• She won the silver medal in the 25m women's shooting event at the ISSF World Cup 2025, which was held in Lima, Peru.

• The 25m shooting event is one of the prominent categories in shooting competitions. It requires precision, focus, and technical expertise.

• In the ISSF World Cup, medals are awarded based on performance in individual events like 25m, 50m, 75m, and 100m shooting.

• The achievement of Simranpreet Kaur Brar in this specific category highlights her exceptional skills and dedication to the sport.

Additional Information

• ISSF World Cup:

• The International Shooting Sport Federation (ISSF) organizes the ISSF World Cup annually, bringing together top shooters from across the globe.
• Events in the ISSF World Cup include categories based on distance and shooting equipment, such as rifle, pistol, and shotgun.
• The competition serves as a platform for shooters to qualify for the Olympic Games and other major international events.
• The 2025 edition was held in Lima, Peru, showcasing remarkable performances from athletes worldwide.
• Shooting Events Categories:
• The 25m event is a pistol shooting category requiring shooters to hit targets from a distance of 25 meters.
• The 50m event is a rifle or pistol category that demands a higher level of precision due to the increased distance.
• The 75m and 100m events are generally associated with rifle shooting and require advanced skills in long-range target shooting.
• Achievements of Indian Shooters:
• India has a rich history in shooting sports, with shooters like Abhinav Bindra, Gagan Narang, and Manu Bhaker earning international accolades.
• Simranpreet Kaur Brar's silver medal at the ISSF World Cup 2025 adds to India's growing legacy in the sport.
• The success of Indian shooters is supported by initiatives like the Target Olympic Podium Scheme (TOPS) and specialized coaching facilities.
• Importance of Shooting Sports:
• Shooting sports are a test of accuracy, focus, mental strength, and coordination.
• They are widely recognized and celebrated in international competitions, including the Olympics, Asian Games, and Commonwealth Games.
• The ISSF World Cup serves as a crucial platform for shooters to hone their skills and compete at the highest level.

Important Points

• Simranpreet Kaur Brar's Contribution:
• Her victory in the 25m event underlines her hard work, precise techniques, and mental resilience.
• She represents the growing prominence of Indian women in international sports.
• Training and Support:
• Indian shooters undergo rigorous training programs under the guidance of experienced coaches.
• Government schemes like TOPS and private sponsorships play a key role in nurturing talent.
• Global Significance of ISSF World Cup:
• The ISSF World Cup is a premier competition that sets the stage for athletes to demonstrate their skills.
• It helps in preparing shooters for other international events and contributes to their career development.

Q15. Answer: (c) Article 38

The correct answer is Article 38.

Key Points

• Article 38 of the Indian Constitution falls under the Directive Principles of State Policy (DPSP), which are enshrined in Part IV of the Constitution.
• It directs the state to promote the welfare of the people by securing and protecting a social order based on justice—social, economic, and political.
• Article 38 also mandates the state to minimize inequalities in income, status, facilities, and opportunities, ensuring inclusive development.
• The Directive Principles are non-justiciable, meaning they cannot be enforced in a court of law, but they provide essential guidelines for governance and policymaking.
• Dr. B.R. Ambedkar, the architect of the Constitution, emphasized the importance of the DPSPs as fundamental in achieving the goals of a welfare state.
• Hence, Article 38 is the correct answer as it explicitly directs the state to promote the welfare of the people.

Additional Information

• Directive Principles of State Policy (DPSP):
• DPSPs are guidelines for the government to establish a welfare state. They are inspired by the Irish Constitution.
• Part IV of the Constitution includes Articles 36 to 51, outlining various principles for socio-economic justice.
• They aim to promote equality, eradicate poverty, and ensure adequate living standards for all citizens.
• Examples include providing free legal aid (Article 39A), equitable distribution of resources (Article 39), and promotion of educational and economic interests of weaker sections (Article 46).
• Other Relevant Articles in DPSP:
• Article 43: It directs the state to secure a living wage, decent working conditions, and ensure social and cultural opportunities for

all workers.

• Article 47: It emphasizes raising the level of nutrition and public health and the prohibition of intoxicating substances harmful to health.

• Article 42: It directs the state to make provisions for securing just and humane conditions for work and maternity relief.

• Fundamental Features of DPSP:

• The DPSPs are non-enforceable but provide moral and political guidance to the legislature and executive.

• They complement the Fundamental Rights by focusing on the welfare of society rather than individual rights.

• They aim to bridge the gap between the rich and poor, ensuring socio-economic justice.

• Important Examples of Laws Inspired by DPSP:

• The Minimum Wages Act aims to ensure fair wages for workers, inspired by Article 43.

• The National Food Security Act addresses concerns of Article 47 by ensuring adequate nutrition for all citizens.

• Various labor laws, such as maternity relief provisions, are directly inspired by Article 42.

Important Points

• Article 38: It explicitly focuses on welfare and justice, making it central to the establishment of a welfare state in India.

• The DPSPs are considered fundamental to governance and aim to fulfill the goals set forth in the Preamble of the Constitution—justice, liberty, equality, and fraternity.

• While they are non-justiciable, their implementation reflects the commitment of the government toward achieving socio-economic justice.

• These principles are often referred to as the Conscience of the Constitution, as they embody the goals and aspirations of the Indian polity.

• Several constitutional amendments and landmark judgments emphasize the importance of DPSPs in policymaking and governance, even though they are not legally enforceable.

Q16. Answer: (a) To provide temporary storage for running programs

The correct answer is To provide temporary storage for running programs.

Key Points

• RAM (Random Access Memory) is a volatile memory used by computers to temporarily store data that is actively being used or processed. It enables faster access to data compared to permanent storage devices like hard drives or SSDs.

• When a program or application is executed, its data and instructions are loaded into the RAM, allowing the processor to access them quickly. This ensures smooth functioning and faster processing of tasks.

• RAM does not store data permanently. Once the computer is turned off or restarted, the data in RAM is erased. This makes it different from storage devices like hard drives or solid-state drives (SSDs).

• The size of the RAM significantly impacts the computer’s performance. A larger RAM capacity allows more applications to run simultaneously without slowing down the system.

• Dynamic RAM (DRAM) and Static RAM (SRAM) are two common types of RAM. DRAM is widely used in computers as the main memory, while SRAM is faster but more expensive and is typically used in cache memory.

Additional Information

• Option 2: To control the printer: This statement is incorrect. Controlling external devices like printers is managed by the computer's operating system and drivers, not by RAM.

• Option 3: To store permanent data: Permanent data storage is handled by devices like hard drives, SSDs, or optical disks. RAM is volatile and cannot retain data after the system is turned off.

• Option 4: To process graphics: Graphics processing is primarily handled by the GPU (Graphics Processing Unit) or integrated graphics, not RAM. However, a portion of RAM may be allocated as video memory for integrated graphics.

• Uses and Applications of RAM:

• RAM is used in various devices, including computers, laptops, smartphones, tablets, gaming consoles, and servers.

• High RAM capacity is essential for tasks like video editing, 3D rendering, gaming, and multitasking.

• For example, modern gaming systems require at least 8GB to 16GB of RAM for smooth performance.

• Important Facts:

• RAM speed is measured in MHz or GHz, and its efficiency is determined by its DDR type (e.g., DDR4, DDR5).

• In 2023, DDR5 RAM is the latest and fastest version, offering better bandwidth and efficiency compared to DDR4.

• Leading manufacturers of RAM include Samsung, Corsair, Kingston, and Crucial.

Important Points

• Volatile Nature of RAM: RAM requires a continuous power supply to retain data. If the power is interrupted, all data stored in RAM is lost.

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• Relation with CPU: RAM acts as a bridge between the storage device and the CPU, providing quick access to data needed for processing.

• Virtual Memory: When RAM is insufficient to handle all active tasks, the computer uses virtual memory, a portion of the hard drive, to store overflow data. This process is slower than using physical RAM.

• Cache Memory: Cache memory is a smaller and faster type of memory located inside the CPU. It works alongside RAM to enhance processing speed by storing frequently accessed data.

• Future Trends: Advanced technologies like 3D XPoint and ReRAM (Resistive RAM) are being developed to improve speed, capacity, and energy efficiency in memory systems.

Q17. Answer: (d) Vertically Launched Short-Range Surface-to-Air Missile

The correct answer is Vertically Launched Short-Range Surface-to-Air Missile.

Key Points

• The Vertically Launched Short-Range Surface-to-Air Missile (VL-SRSAM) was successfully test-fired by the Defence Research and Development Organisation (DRDO) and the Indian Navy on 26 March 2025.

• VL-SRSAM is a state-of-the-art indigenous missile system designed to counter aerial threats such as fighter aircraft, drones, and helicopters at close ranges.

• The missile is equipped with advanced radar systems and a radio frequency seeker for precise target detection and tracking.

• The successful test was conducted from an Indian Naval Ship off the coast, demonstrating its capability to neutralize aerial targets in a vertically launched mode.

• This missile plays a crucial role in enhancing the self-reliance of India in defense technology, aligning with the ‘Make in India’ initiative.

• The VL-SRSAM has a range of approximately 40 km, making it suitable for defending naval vessels from aerial threats.

Additional Information

• Short-Range Sea-to-Surface (Coast) Missile:

• This type of missile is designed for targeting enemy installations or vessels near the coast.

• It generally has a smaller range compared to medium or long-range missiles.

• Currently, India does not have a specific missile categorized under this name.

• Advanced Short Range Air-to-Air Missile:

• These missiles are primarily designed for air-to-air combat between fighter aircraft.

• They are equipped with infrared or radar seekers for precise targeting.

• One example is the ASRAAM, developed by MBDA, but it is not indigenously developed by India.

• Short-Range Anti-Tank Missile:

• This category includes missiles designed to penetrate armored vehicles and tanks.

• India has developed the Nag missile, which falls under this category but is not relevant to the current test conducted on 26 March 2025.

• Vertically Launched Short-Range Surface-to-Air Missile:

• The VL-SRSAM is indigenously developed by DRDO for the Indian Navy.

• It is designed to provide quick reaction defense capabilities against aerial threats.

• This missile is launched vertically and can engage targets at a range of up to 40 km.

• Its features include advanced electronic warfare systems, precise targeting capabilities, and high mobility.

• It is a part of India’s efforts to strengthen its defense technology and reduce dependency on foreign imports.

Important Points

• DRDO’s Role:

• The Defence Research and Development Organisation (DRDO) is responsible for the development of advanced defense technologies in India.

• DRDO has been instrumental in achieving self-reliance in missile technology through projects like Agni, Prithvi, and Akash.

• The VL-SRSAM is a testament to India’s capability to develop cutting-edge defense systems indigenously.

• Indian Navy’s Preparedness:

• The successful test-firing of VL-SRSAM showcases the Indian Navy’s preparedness to counter aerial threats.

• Integration of such advanced missile systems into naval vessels significantly enhances maritime security.

• It also demonstrates the collaboration between DRDO and the Indian Navy in strengthening defense capabilities.

• Make in India Initiative:

• The VL-SRSAM aligns with the government’s ‘Make in India’ initiative, aimed at promoting indigenous manufacturing and reducing dependency on foreign imports.

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• Such developments are crucial for achieving self-reliance in critical sectors like defense.

Q18. Answer: (a) Emphysema

The correct answer is Emphysema.

Key Points

• Emphysema is a chronic lung disease characterized by the damage and destruction of the inner walls of the lungs' air sacs, called alveoli. This reduces the surface area available for oxygen exchange and leads to breathing difficulties.

• The alveoli are small, balloon-like structures in the lungs responsible for oxygen and carbon dioxide exchange during respiration. In emphysema, the walls of these sacs weaken and rupture, forming larger air spaces instead of many small ones.

• Emphysema typically develops due to long-term exposure to irritants such as tobacco smoke, air pollution, or chemical fumes. Smoking is the leading cause of emphysema worldwide.

• The primary symptoms of emphysema include shortness of breath, wheezing, and a persistent cough. Over time, the condition may severely impact quality of life.

• It is classified as a form of Chronic Obstructive Pulmonary Disease (COPD), often occurring alongside chronic bronchitis. Both conditions involve airflow obstruction and difficulty in breathing.

Additional Information

• Other Diseases Mentioned in the Options:

• Dyspepsia: Dyspepsia, also known as indigestion, is a condition affecting the digestive system. It is characterized by discomfort or pain in the upper abdomen, bloating, and nausea. It is not related to lung diseases.

• Arrhythmias: Arrhythmias refer to irregular heart rhythms caused by problems with the heart's electrical system. They can result in palpitations, dizziness, or chest pain. This condition is unrelated to lung damage.

• Cystic Fibrosis: Cystic fibrosis is a genetic disorder that affects the lungs and digestive system. It leads to thick mucus build-up in the lungs, which causes difficulty in breathing and frequent infections. Unlike emphysema, it is not caused by external irritants like smoking.

• Impact of Emphysema:

• Emphysema can lead to complications such as pulmonary hypertension, where increased blood pressure occurs in the arteries of the lungs.

• In severe cases, emphysema can result in respiratory failure, where the lungs cannot provide enough oxygen to the body or remove carbon dioxide.

• Treatment:

• Though there is no cure for emphysema, treatments aim to manage symptoms and slow the progression of the disease.

• Common treatments include bronchodilator medications, oxygen therapy, pulmonary rehabilitation, and, in severe cases, lung volume reduction surgery.

• Lifestyle changes, such as quitting smoking, avoiding air pollutants, and adopting a healthy diet, play a crucial role in managing the disease.

• Prevention:

• Preventing emphysema primarily involves avoiding smoking and exposure to secondhand smoke.

• Minimizing exposure to air pollutants and wearing protective masks in environments with chemical fumes can help reduce the risk.

• Regular health check-ups can help in early detection and better management of risk factors.

Important Points

• Global Prevalence: Emphysema is most common among individuals aged 40 years and above. It is a significant public health concern, particularly in countries with high smoking rates.

• Healthcare Costs: The treatment of chronic respiratory diseases, including emphysema, imposes a financial burden on healthcare systems worldwide, especially in low-income and middle-income countries.

• Research and Innovation: Advances in medical technology, such as targeted lung therapies, are improving the quality of life for emphysema patients.

• COPD Awareness: November is recognized as National COPD Awareness Month to educate the public about chronic respiratory diseases, including emphysema.

Q19. Answer: (a) Dadabhai Naoroji

The correct answer is Dadabhai Naoroji.

Key Points

• Dadabhai Naoroji is known as the 'Grand Old Man of India' for his immense contributions to India's independence movement and economic thought.

• He was the first Indian to be elected as a Member of Parliament in the British House of Commons in 1892, representing the

Liberal Party.

• Dadabhai Naoroji propagated the theory of 'Drain of Wealth', highlighting how British colonial rule exploited India's resources and wealth.

• He was a founding member of the Indian National Congress (INC) in 1885 and served as its president three times—in 1886, 1893, and 1906.

• His book, 'Poverty and Un-British Rule in India', provided detailed evidence of economic exploitation under colonial rule and became a cornerstone of Indian economic nationalism.

Additional Information

• Lala Lajpat Rai:

• Lala Lajpat Rai was an important freedom fighter known as 'Punjab Kesari' or the 'Lion of Punjab'.

• He played a key role in the formation of the Indian National Congress and was a leader of the Swadeshi Movement.

• He is remembered for his protests against the Simon Commission in 1928, where he succumbed to injuries inflicted during a lathi charge.

• Gopal Krishna Gokhale:

• Gopal Krishna Gokhale was a senior leader of the Indian National Congress and a social reformer.

• He was a mentor to Mahatma Gandhi and emphasized moderate political methods for achieving independence.

• He founded the Servants of India Society in 1905 to promote education and social welfare.

• Surendranath Banerjee:

• Surendranath Banerjee was one of the earliest leaders of India's freedom struggle and a founder of the Indian National Association in 1876.

• He was known for his advocacy of constitutional reforms and moderate political methods.

• He also played a key role in the formation of the Indian National Congress.

Important Points

• Dadabhai Naoroji's Contributions:

• He emphasized the need for self-rule and economic independence, forming the basis of Indian nationalism.

• His advocacy for Indians' representation in British administrative roles helped raise awareness about colonial exploitation.

• He was instrumental in creating a political awakening among Indians and advocating for their rights.

• The Drain of Wealth Theory:

• Dadabhai Naoroji argued that British policies resulted in the systematic extraction of India's resources and wealth.

• He identified factors such as excessive taxation, trade policies favoring Britain, and exploitation of Indian labor as causes of economic decline.

• This theory became a rallying point for Indian economic nationalism and self-rule demands.

Q20. Answer: (b) Western Ghats

The correct answer is Western Ghats.

Key Points

• The Western Ghats are recognized globally for their rich biodiversity, hosting numerous endemic species of flora and fauna.

• The range is designated as a UNESCO World Heritage Site due to its ecological significance and contribution to preserving biodiversity.

• The Western Ghats stretch along the western coast of India, covering states like Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.

• Its forests play a crucial role in regulating the climate and act as a significant carbon sink, helping mitigate the effects of climate change.

• The Western Ghats are home to numerous national parks, wildlife sanctuaries, and biosphere reserves such as Silent Valley National Park and the Nilgiri Biosphere Reserve.

Additional Information

• Satpura Range:

• Located in central India, the Satpura Range spans across Madhya Pradesh, Maharashtra, and Chhattisgarh.

• While it hosts diverse flora and fauna, it is not designated as a UNESCO World Heritage Site.

• The range is known for its reserves, such as the Satpura Tiger Reserve, and provides a habitat for various wildlife species.

• Eastern Ghats:

• The Eastern Ghats are a discontinuous range of mountains running parallel to the eastern coast of India.

• They extend across states such as Odisha, Andhra Pradesh, Telangana, and Tamil Nadu.

• Though rich in biodiversity, the Eastern Ghats have not been recognized as a UNESCO World Heritage Site.

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• Chotanagpur Plateau:
• Located in eastern India, the Chotanagpur Plateau spans across Jharkhand, Odisha, and West Bengal.
• It is primarily known for its mineral wealth, including coal and iron ore, rather than biodiversity.
• The plateau hosts significant forest cover but lacks the ecological distinction of being a UNESCO World Heritage Site.
• Important Points:
• The Western Ghats are considered one of the eight "hottest hot-spots" of biological diversity globally.
• It is a region of high rainfall and is essential for water resources, hosting rivers like Krishna, Godavari, and Kaveri.
• The Western Ghats are home to many indigenous communities that depend on its resources for their livelihoods.
• The range plays a vital role in the Indian monsoon system, influencing weather patterns across the country.

Q21. Answer: (c) Gynoecium

The correct answer is Gynoecium.

Key Points

• Gynoecium is the female reproductive organ of a flower in angiosperms. It consists of one or more carpels, which are the structural units of the gynoecium.
• The gynoecium includes three main parts: ovary, style, and stigma.
• The ovary contains ovules, which develop into seeds after fertilization.
• The style is a tube-like structure connecting the stigma to the ovary.
• The stigma is the receptive surface for pollen grains during pollination.
• The gynoecium plays a vital role in sexual reproduction by facilitating pollination, fertilization, and seed development.
• It is a defining feature of angiosperms, helping ensure successful reproduction and species propagation.
• Other parts of a flower, such as petals, stamens, and androecium, have different roles and are not involved in female reproduction.

Additional Information

• Petal:
• Petals are the colorful, often fragrant parts of a flower that attract pollinators such as bees and butterflies.
• They do not contribute directly to reproduction but play a supportive role in pollination.
• Androecium:
• The androecium is the male reproductive organ of a flower, consisting of stamens.
• Each stamen has two parts: the anther (produces pollen) and the filament.
• Stamen:
• Stamens are part of the androecium and are responsible for producing and dispersing pollen grains.
• They facilitate male gamete transfer to the stigma of the gynoecium.
• Female Reproductive Process in Flowers:
• Pollination is the transfer of pollen grains from the anther to the stigma.
• Fertilization occurs when male gametes from pollen unite with ovules in the ovary.
• After fertilization, ovules develop into seeds, and the ovary matures into a fruit.
• Angiosperms:
• Angiosperms are flowering plants that reproduce sexually through their reproductive organs (androecium and gynoecium).
• They are the most diverse group of plants, containing over 300,000 species.

Important Points

• Pollination and Fertilization:
• Pollination can be either self-pollination (within the same flower or plant) or cross-pollination (between different plants).
• Fertilization results in the formation of a zygote, which develops into an embryo and eventually a seed.
• Fruit Formation:
• The ovary develops into a fruit, protecting the seeds and aiding in their dispersal.
• Fruits can be classified as simple, aggregate, or multiple based on their development.
• Evolutionary Importance:
• Flowering plants dominate terrestrial ecosystems due to their efficient reproductive strategies.
• The gynoecium ensures genetic diversity and species survival through sexual reproduction.

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Q22. Answer: (d) Cloth

The correct answer is Cloth.

Key Points

• Kalamkari is a traditional Indian art form that primarily uses Cloth as the base material for creating intricate designs. It is widely recognized for its hand-painted or block-printed textiles.

• The word Kalamkari is derived from the Persian words "Kalam" (pen) and "Kari" (craftsmanship), indicating the art of drawing with a pen on fabric.

• This art form is prevalent in regions of Andhra Pradesh and Telangana, where artisans create exquisite designs using natural dyes and intricate techniques.

• Natural dyes such as indigo, turmeric, and pomegranate are used in Kalamkari, emphasizing its eco-friendly and sustainable nature.

• The designs in Kalamkari are typically inspired by Indian mythology, epics like Ramayana and Mahabharata, and intricate floral patterns.

Additional Information

• Historical Background:

• Kalamkari art has been practiced in India for centuries, with its origins traced back to the era of Mughal rulers who patronized this art form.

• It was historically used to narrate stories of gods and goddesses on fabric, making it a significant part of temple architecture and rituals.

• Technique:

• The process involves several steps, including treating the cloth with cow dung, bleach, and natural dyes before the intricate designs are created.

• Artists use bamboo or date palm sticks attached with hair to draw motifs on the fabric using vegetable dyes.

• Types of Kalamkari:

• There are two main types: Srikalahasti style (hand-painted) and Machilipatnam style (block-printed).

• The Srikalahasti style is known for its freehand drawing and storytelling approach, while the Machilipatnam style emphasizes block printing using carved wooden blocks.

• Applications:

• Kalamkari textiles are used in various forms, including sarees, dupattas, wall hangings, and home decor items.

• It is also a popular choice for contemporary fashion, blending traditional art with modern aesthetics.

• Global Recognition:

• Kalamkari art has gained international fame for its uniqueness and sustainable practices, contributing to India's cultural heritage.

• It is often showcased in exhibitions and fashion shows worldwide, promoting traditional Indian craftsmanship.

Important Points

• Natural Dyes: Kalamkari artisans exclusively use natural dyes, avoiding synthetic alternatives, which makes this art form environmentally friendly.

• Geographical Indication (GI) Tag: Kalamkari art has been granted a GI tag, recognizing its uniqueness and protecting it from imitation.

• Challenges: Despite its popularity, Kalamkari faces challenges such as competition from machine-printed fabrics and the labor-intensive nature of its production.

• Government Support: The Indian government and various NGOs have launched initiatives to support Kalamkari artists and promote this traditional art form.

Q23. Answer: (c) 1829

The correct answer is 1829.

Key Points

• The Bengal Sati Regulation was enacted in 1829 by the Governor-General of India, Lord William Bentinck.

• This regulation was aimed at abolishing the practice of Sati, where widows were forced or voluntarily burned alive on their deceased husband’s funeral pyre.

• The regulation declared the practice of Sati illegal and punishable by the courts of law.

• The enactment was a result of efforts by reformers like Raja Ram Mohan Roy, who strongly opposed the practice and advocated for its abolition.

• The law applied to the Bengal Presidency, which was one of the largest administrative regions under British rule at the time.

• The regulation was a landmark step towards social reform in India during the British colonial period.

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Additional Information

• Historical Context:

• The practice of Sati was prevalent in India, particularly among certain communities, where widows were either forced or voluntarily immolated on their husband's pyre.

• It was considered an act of devotion and purity, but over time, it led to severe human rights violations.

• Reformers like Raja Ram Mohan Roy played a crucial role in raising awareness and advocating for the abolition of Sati.

• Role of Lord William Bentinck:

• Lord William Bentinck was the Governor-General of India from 1828 to 1835.

• He was known for his progressive policies and reforms, including the abolition of Sati and other regressive practices.

• His administration marked the beginning of significant social reforms under British rule.

• Role of Raja Ram Mohan Roy:

• Raja Ram Mohan Roy, known as the Father of Modern India, was a social reformer who fought against social evils like Sati.

• He advocated for women's rights and education and was instrumental in influencing the British government to abolish Sati.

• He founded the Brahmo Samaj, which worked for the modernization of Indian society and eradication of social evils.

• Impact of Bengal Sati Regulation:

• The regulation was a landmark step towards ensuring women’s rights and dignity.

• It set a precedent for future social reforms in India, including the abolition of child marriage and promotion of widow remarriage.

• The regulation highlighted the role of social reformers and the British colonial administration in addressing societal issues.

• Important Points:

• The regulation applied initially to the Bengal Presidency but later extended to other regions under British control.

• It marked the beginning of legislative intervention in social practices in India.

• The abolition of Sati was a significant step towards the modernization and humanization of Indian society.

• The Bengal Sati Regulation laid the foundation for future social reforms in India during the colonial and post-independence periods.

Q24. Answer: (d) An extra-constitutional advisory body created by a government resolution in 1950.

The correct answer is An extra-constitutional advisory body created by a government resolution in 1950.

Key Points

• The Planning Commission of India was established through a government resolution by the Cabinet in March 1950. It was not created under any constitutional article or statute.

• The Planning Commission was tasked with the responsibility of formulating five-year plans for the socio-economic development of the nation.

• It was an advisory body that worked under the chairmanship of the Prime Minister and had no direct executive power.

• The Planning Commission aimed to assess resources, formulate plans, and allocate funds for various sectors of the economy.

• The Commission was replaced by the NITI Aayog (National Institution for Transforming India) in January 2015, which focuses on fostering cooperative federalism and providing strategic and technical advice.

Additional Information

• Constitutional vs Extra-Constitutional Body:

• A constitutional body is created by provisions of the Constitution, like the Election Commission and Comptroller and Auditor General of India.

• An extra-constitutional body is not mentioned in the Constitution but is established by the government through resolutions or executive orders, such as the Planning Commission.

• Statutory Body:

• A statutory body is created by an Act of Parliament or state legislature and has legal backing. Examples include SEBI and National Human Rights Commission.

• The Planning Commission was not a statutory body, as it was not established by any legislative act.

• Functions of Planning Commission:

• It helped in assessing the country’s resources and determining priorities for development.

• It formulated five-year plans to ensure balanced regional development and economic growth.

• It advised the government on policy matters related to development and resource allocation.

• Transition to NITI Aayog:

• NITI Aayog was established in 2015 to replace the Planning Commission.

• Unlike the Planning Commission, NITI Aayog is a think tank that focuses on fostering cooperative federalism between the central

and state governments.

• It emphasizes policy innovation, data-driven decision-making, and long-term strategic planning.

Important Points

• Five-Year Plans:

• The Planning Commission initiated Five-Year Plans in India, with the first plan launched in 1951.

• These plans focused on various sectors, including agriculture, industry, education, and healthcare, to promote economic growth.

• The last Five-Year Plan was the 12th Plan (2012–2017), after which the concept was discontinued with the formation of NITI Aayog.

• Prime Minister's Role:

• The Prime Minister of India served as the Chairman of the Planning Commission.

• It worked directly under the Prime Minister's guidance, ensuring alignment with national priorities.

• Legacy:

• The Planning Commission played a significant role in India's initial development after independence, shaping the country's economic policies.

• Its legacy continues to influence policy-making through data-driven approaches adopted by NITI Aayog.

Q25. Answer: (b) Bangladesh

The correct answer is Bangladesh.

Key Points

• Mongla Port is located in the southwestern part of Bangladesh, in the Bagerhat district, and is the country's second-largest seaport.

• It is strategically situated on the Pasur River, approximately 62 km north of the Bay of Bengal, providing access to both domestic and international trade routes.

• The port has recently gained significant importance due to its strategic development initiatives and increased trade activities, particularly under the India-Bangladesh bilateral agreements.

• In recent years, Mongla Port has been modernized to handle larger vessels and increased cargo volumes, making it a crucial hub for regional trade and commerce.

• The port serves as a vital link for the Bangladesh, Bhutan, India, and Nepal (BBIN) sub-regional cooperation, facilitating cross-border trade and connectivity.

Additional Information

• Location and Significance of Mongla Port:

• Mongla Port is situated at the confluence of the Pasur and Mongla Rivers, which provides a natural harbor for large vessels.

• It is approximately 48 km south of Khulna, the nearest major city, and is connected by road and rail networks.

• Its location near the Sundarbans, the world's largest mangrove forest, adds ecological significance to its geographical importance.

• Strategic Developments:

• The Government of Bangladesh has partnered with international organizations and neighboring countries, including India, to enhance the port's capacity and infrastructure.

• The port has been equipped with modern facilities, including container terminals, to accommodate larger ships and facilitate efficient cargo handling.

• Improved infrastructure at Mongla Port has allowed it to support the growing trade demands of Bangladesh and its neighboring countries, particularly through the BBIN initiative.

• India-Bangladesh Trade Relations:

• India and Bangladesh have signed agreements to use Mongla Port for transshipment of goods to and from India, particularly for the northeastern states of India.

• This development is part of broader regional cooperation efforts, aiming to boost economic growth and connectivity in South Asia.

• Mongla Port is one of the key components of the BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) framework.

• Important Features of Mongla Port:

• The port can handle vessels with a maximum draft of 9.5 meters and a length of up to 225 meters.

• It primarily handles commodities like fertilizers, food grains, cement, and industrial raw materials, as well as general cargo and containers.

• The port has a number of jetties, warehouses, and other facilities to support its operations efficiently.

Important Points

• Other Major Ports in Bangladesh:

• Chattogram Port: The largest and busiest seaport in Bangladesh, handling the majority of the country's imports and exports.

• Payra Port: A relatively new port aimed at boosting trade and reducing pressure on Chattogram and Mongla ports.

• India-Bangladesh Connectivity Projects:

• The Agartala-Akhaura Rail Link project aims to improve connectivity between India's northeast and Bangladesh.

• India and Bangladesh are also collaborating on multimodal transport projects, such as inland waterways and coastal shipping agreements, to enhance trade and economic ties.

• Geopolitical Importance:

• Mongla Port plays a strategic role in China's Belt and Road Initiative (BRI), as Bangladesh is a member of the initiative.

• The port's development is significant for countering regional influence and fostering cooperation within South Asia.

Q26. Answer: (a) IIIT-Allahabad

The correct answer is IIIT-Allahabad.

Key Points

• Researchers at the Indian Institute of Information Technology, Allahabad (IIIT-A) developed a low-cost microfluidic device that separates plasma from whole blood within minutes using a hydrodynamic micro-channel design.

• The device also performs rapid water purification (removing suspended particles and bacteria) using the same microchannel principles, producing ~one drop of purified fluid per second in prototype tests.

• Cost advantage: the team reports an expected manufacturing price of about Rs. 1,000 for the basic unit—orders of magnitude cheaper than conventional centrifuges and many commercial water-purification systems—making it suitable for rural clinics and field use.

• Technology & recognition: the work (led by Dr. Amit Prabhakar and students) was funded by India’s DST, published in a Royal Society of Chemistry journal and granted patent protection (20-year patent filings reported).

Additional Information

• IIT Kanpur:

• Located in Kanpur, Uttar Pradesh, it is one of India's premier engineering institutions.

• Founded in 1959, IIT Kanpur has consistently been at the forefront of technological research and innovation.

• Known for its cutting-edge research in areas like biotechnology, environmental science, artificial intelligence, and healthcare technologies.

• It collaborates with several national and international organizations for research and development.

• Plasma Separation Technology:

• Plasma separation is a process of isolating plasma (the liquid component of blood) from other blood components like red blood cells and white blood cells.

• This is vital for medical diagnostics, treatment of diseases, and use in therapies like plasma exchange for autoimmune disorders.

• The innovative device developed by IIT Kanpur makes this process faster, more affordable, and widely accessible.

• Water Purification:

• Water purification is essential for removing contaminants and ensuring access to clean drinking water.

• The device developed by IIT Kanpur integrates technology for purification, addressing the problem of waterborne diseases.

• This innovation is particularly significant for rural areas with limited access to clean water facilities.

• Comparison with Other Institutions:

• IIIT-Allahabad: Primarily focuses on information technology research and education but is less involved in healthcare and environmental technologies.

• IIT Hyderabad: Known for advancements in AI, robotics, and sustainable energy but not specifically associated with plasma separation or water purification innovations.

• IISc Bangalore: Renowned for scientific research but is more focused on fundamental science and engineering rather than applied healthcare devices.

Important Points

• Low-cost innovation: The device's pricing at Rs. 1,000 makes it accessible for widespread use in healthcare and water purification applications.

• Wider impact: It addresses two critical issues: plasma separation for medical purposes and clean water access, benefiting both urban and rural populations.

• Technological advancement: IIT Kanpur's solution showcases its ability to translate research into practical applications for societal benefit.

• Global recognition: Innovations like this enhance India's global standing in technological advancements and problem-solving.

Q27. Answer: (d) CSIR-Central Food Technological Research Institute

The correct answer is CSIR-Central Food Technological Research Institute.

Key Points

• CSIR-Central Food Technological Research Institute (CFTRI) developed the innovative paper-based technology 'Freshness Keeper' in 2025 to extend the freshness of cut flowers.

• The technology uses a specialized paper infused with compounds that help maintain the freshness of flowers by reducing microbial activity and ethylene production, which are primary causes of decay.

• 'Freshness Keeper' is designed to be cost-effective and environmentally friendly, providing a sustainable solution for the floral industry.

• This innovation is particularly beneficial for businesses involved in flower exports, as it ensures flowers remain fresh during long transportation times.

• CSIR-CFTRI is renowned for its contributions to food science and technology, with a focus on enhancing the shelf life and quality of perishable items, including flowers.

Additional Information

• CSIR-Central Food Technological Research Institute:

• Located in Mysuru, Karnataka, CFTRI is a constituent laboratory of the Council of Scientific and Industrial Research (CSIR).

• It was established in 1950 and specializes in food technology innovations and research.

• CFTRI actively collaborates with industries and institutions to develop solutions for food preservation, processing, and safety.

• Features of 'Freshness Keeper' Technology:

• It uses biodegradable materials, making it eco-friendly and reducing environmental impact.

• The paper is treated with anti-microbial agents and ethylene inhibitors to delay the aging and wilting process of flowers.

• The technology is adaptable to various types of flowers and can be customized based on specific requirements.

• Applications:

• This innovation can be used in flower shops, export packaging, and wedding decor industries.

• It significantly enhances the value chain by ensuring better quality and longer-lasting freshness of flowers.

• Other Contributions of CSIR-CFTRI:

• Development of technologies for food packaging, fortification, and preservation.

• Research on post-harvest management to reduce wastage in perishable goods.

• Advancements in food processing machinery to improve efficiency and quality.

Important Points

• Indian Institute of Horticulture Research: Specializes in horticulture-related research but is not involved in developing 'Freshness Keeper.'

• IIT Madras and IIT Bombay: Known for innovations in engineering and technology, but they do not focus specifically on food or floral preservation technologies.

• CSIR-CFTRI: Established expertise in food preservation and post-harvest technologies, making it the most likely institute to develop such innovations.

Q28. Answer: (b) Amba river

The correct answer is Amba river.

Key Points

• National Waterway 10 (NW-10) is one of the recognized inland waterways in India under the National Waterways Act, 2016. It is established to promote inland navigation and transport.

• The Amba River is located in the state of Maharashtra, and it flows near Dharamtar Port, which serves as a crucial point for inland water transport.

• NW-10 covers the stretch of the Amba River from Dharamtar Port to its confluence with the Arabian Sea. This stretch is significant for trade and transport activities.

• The recognition of NW-10 under the National Waterways Act, 2016 aims to enhance the utilization of inland waterways for reducing transportation costs and improving logistics efficiency.

• Other rivers mentioned in the options, such as the Brahmaputra, Chambal, and Yamuna, are associated with different national waterways like NW-2, NW-3, and NW-1 respectively. They are not part of NW-10.

Additional Information

• National Waterways Act, 2016:

• India passed the National Waterways Act in March 2016, identifying 111 inland waterways as national waterways.

• The Act aims to promote inland water transport for trade, tourism, and efficient logistics.

• Amba River:
• The Amba River flows through the Raigad district of Maharashtra.
• Its proximity to Dharamtar Port has made it crucial for inland water transport activities.
• National Waterway 1 (NW-1):
• NW-1 is one of the longest waterways in India, covering the stretch of the Ganga River from Allahabad to Haldia.
• This waterway is significant for trade and transport across northern and eastern India.
• National Waterway 2 (NW-2):
• NW-2 covers the stretch of the Brahmaputra River from Dhubri to Sadiya in Assam.
• It plays a vital role in connecting the northeastern region of India with the rest of the country.
• National Waterway 3 (NW-3):
• NW-3 is located in Kerala and covers the stretch from Kollam to Kottapuram, including the Champakara and Udyogmandal canals.
• It facilitates transport and trade activities in the southern state of Kerala.

Important Points

• Inland Waterways:
• India's waterways are divided into national and state waterways. National waterways are regulated by the central government, while state waterways are managed by respective states.
• Inland waterways are eco-friendly and cost-effective methods of transportation compared to road and rail transport.
• Advantages of Inland Water Transport:
• It reduces carbon emissions and contributes to environmental sustainability.
• It lowers transportation costs, especially for bulk cargo and goods.
• It promotes regional development by improving connectivity and logistics efficiency.
• Dharamtar Port:
• Located on the Amba River, Dharamtar Port is a vital inland port that supports logistics and trade activities.
• It contributes significantly to the economic activities of Maharashtra and neighboring regions.

Q29. Answer: (a) 2006

The correct answer is 2006.

Key Points

• The South Asian Free Trade Area (SAFTA) is a free trade agreement signed by the SAARC countries to promote regional economic cooperation and reduce trade barriers.
• The agreement was signed during the 12th SAARC Summit, held in Islamabad, Pakistan, in January 2004.
• The SAFTA agreement officially came into force on 1st January 2006, aiming to enhance trade and economic integration among the member countries.
• The SAARC countries involved in this agreement include India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan, Maldives, and Afghanistan.
• Under SAFTA, member nations agreed to reduce custom duties to 5% or less within a fixed time frame, with special provisions for least-developed countries (LDCs).

Additional Information

• SAARC (South Asian Association for Regional Cooperation):
• SAARC was established in 1985 in Dhaka, Bangladesh, with the goal of promoting economic and cultural cooperation among South Asian countries.
• The current member countries of SAARC include Afghanistan (joined in 2007), Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.
• SAARC focuses on areas such as trade, economic development, culture, education, and disaster management.
• Objectives of SAFTA:
• SAFTA's main objective is to reduce trade barriers, including tariffs and quotas, among member countries.
• It aims to promote economic growth and regional integration in South Asia.
• Special provisions are included for least-developed countries (LDCs) in the region, such as Bangladesh, Bhutan, Nepal, and Maldives.
• Features of SAFTA:
• SAFTA includes provisions for trade liberalization, dispute settlement mechanisms, and rules of origin.
• It encourages the member countries to provide technical assistance to weaker economies in the region.

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• The agreement prioritizes the reduction of tariffs to 5% or less within a specific time period.

• Challenges of SAFTA:

• Despite its goals, political tensions among member states, especially between India and Pakistan, have hindered its effectiveness.

• Several countries have been slow to implement tariff reductions and other agreed provisions.

• The disparity in economic development levels among member countries poses challenges for equal benefits from the agreement.

• Other Regional Free Trade Agreements:

• ASEAN Free Trade Area (AFTA): A trade bloc agreement by the Association of Southeast Asian Nations aimed at reducing tariffs and increasing trade among member countries.

• North American Free Trade Agreement (NAFTA): A trade agreement between the United States, Canada, and Mexico, now replaced by the United States-Mexico-Canada Agreement (USMCA).

• European Union Customs Union: A trade bloc that allows free movement of goods among EU member states without customs checks.

Q30. Answer: (b) There was participation of all religions and genders in this rebellion.

The correct answer is There was participation of all religions and genders in this rebellion..

Key Points

• Fakir-Sanyasi Rebellion: It was a series of uprisings against the British East India Company between the late 18th and early 19th centuries in Bengal. This rebellion was initiated by ascetics, both Hindu Sanyasis and Muslim Fakirs.

• Devi Chaudhurani and Bhawani Pathak: Devi Chaudhurani was a prominent woman leader, and Bhawani Pathak was a male leader of this rebellion. Their association highlights the participation of women in the movement alongside men.

• Inclusivity: The rebellion was marked by the participation of different religious communities, including Hindus and Muslims, demonstrating unity against colonial exploitation.

• Social Context: It was not restricted to a single gender or religious group, emphasizing the collective struggle of various sections of society, including ascetics, peasants, and others affected by British policies.

• Statement Validation: The association of leaders like Devi Chaudhurani and Bhawani Pathak proves that all religions and genders participated in the rebellion, making this the correct statement.

Additional Information

• Fakir-Sanyasi Rebellion Background:

• The rebellion was a response to the economic exploitation by the British East India Company, which led to widespread poverty and famine in Bengal.

• It was initiated by religious ascetics who were displaced due to British restrictions on land use and movement.

• Role of Ascetics:

• Both Hindu Sanyasis and Muslim Fakirs were involved, demonstrating religious inclusivity.

• They traveled across Bengal, gathering supporters from local communities, including peasants and workers.

• Devi Chaudhurani:

• She was a female revolutionary leader who played a pivotal role in organizing resistance against British policies.

• Her story was popularized in literature, notably by the Bengali novelist Bankim Chandra Chattopadhyay.

• Bhawani Pathak:

• He was one of the key leaders of the rebellion, symbolizing the active involvement of men in the struggle.

• Bhawani Pathak was known for his leadership and courage in mobilizing people against the British.

• Impact of the Rebellion:

• Though the movement was eventually suppressed by the British, it inspired future resistance movements against colonial rule.

• It highlighted the potential for unity across religious and social boundaries in opposing exploitation.

Important Points

• Statement Analysis:

• Statement 1: "These rebellions were purely religious in nature" – Incorrect, as the rebellion was a socio-economic movement involving ascetics and peasants.

• Statement 2: "There was participation of all religions and genders in this rebellion" – Correct, as the rebellion involved Hindus, Muslims, men, and women.

• Statement 3: "In Bengal, only tribal groups led such resistance" – Incorrect, as the leadership included ascetics and other non-tribal groups.

• Statement 4: "The movement was dominated by the upper caste elite" – Incorrect, as it involved marginalized groups like peasants and ascetics.

• Historical Relevance: The Fakir-Sanyasi rebellion is an early example of organized resistance against colonial oppression in India, laying the groundwork for future movements.

Q31. Answer: (a) Umiam Lake

The correct answer is Umiam Lake.

Key Points

• Umiam Lake, located in Shillong, Meghalaya, is popularly referred to as Barapani Lake. It is a man-made reservoir created in the early 1960s.

• The lake was formed by constructing the Umiam Dam on the Umiam River as part of a hydroelectric project.

• Barapani Lake is a major tourist attraction in Shillong and is known for its serene beauty and the surrounding lush green hills.

• The lake serves multiple purposes, including water storage, hydropower generation, and providing a source of irrigation to nearby areas.

• Its picturesque location also makes it a popular spot for water sports and recreational activities, such as kayaking, boating, and angling.

• The lake holds ecological significance, contributing to groundwater recharge and supporting the local biodiversity of the region.

Additional Information

• Shilloi Lake:

• Shilloi Lake is located in Nagaland, India. Unlike Umiam Lake, it is a natural lake surrounded by hills.

• The lake holds cultural significance for the locals, as they believe it to be a sacred site.

• It is not connected to Shillong or referred to as Barapani Lake.

• Haflong Lake:

• Haflong Lake is situated in Assam and is one of the largest natural water bodies in the state.

• It is located in Haflong town, the only hill station in Assam, and serves as a popular tourist destination.

• It is not related to Shillong or Umiam Lake.

• Jaisamand Lake:

• Jaisamand Lake, also known as Dhebar Lake, is located in Rajasthan and is one of the largest artificial lakes in India.

• The lake was built by Maharana Jai Singh in the 17th century and is surrounded by the Jaisamand Wildlife Sanctuary.

• It is entirely unrelated to Shillong or Barapani Lake.

• Geographical Significance of Umiam Lake:

• Umiam Lake spans over 220 square kilometers, making it one of the largest artificial reservoirs in Meghalaya.

• The lake contributes to the scenic beauty of Meghalaya and is often called the “Scotland of the East” due to its resemblance to Scottish landscapes.

• The lake has a catchment area of about 225 square kilometers, which includes dense forests and rolling meadows.

• Important Attractions around Umiam Lake:

• The lake is surrounded by resorts and recreational facilities, including the famous Umiam Lake Boathouse, which offers boating and other activities for tourists.

• It is also home to the Meghalaya Rural Tourism Centre, which promotes eco-tourism and local handicrafts.

• Visitors can enjoy trekking in the nearby hills or simply relax and enjoy the breathtaking views of the lake.

Q32. Answer: (b) District Judge

The correct answer is District Judge.

Key Points

• The District Judge is the head of the district court in India and is responsible for overseeing the functioning of the civil administration of the court.

• As per the Indian Judiciary System, the District Judge holds authority in both civil and criminal cases within their jurisdiction.

• The District Judge is appointed by the State Government based on eligibility criteria such as experience, qualifications, and performance in judicial services.

• The District Judge also supervises the work of subordinate courts in the district, ensuring proper administration and judicial efficiency.

• Under the provisions of the Code of Civil Procedure (CPC) and the Code of Criminal Procedure (CrPC), the District Judge has the authority to hear appeals from subordinate courts and grant decisions accordingly.

• District judges are required to ensure compliance with the laws of the land and maintain the smooth functioning of judicial processes in their respective districts.

Additional Information

• Chief Judicial Magistrate:

• The Chief Judicial Magistrate (CJM) is responsible for the administration of criminal cases at the district level but does not hold authority over civil cases.

• They handle cases that fall under the jurisdiction of the magistrate's court and are subordinate to the District Judge.

• The CJM is appointed under the provisions of the Criminal Procedure Code (CrPC).

• District Collector:

• The District Collector is an administrative officer responsible for the overall governance and development of the district but does not have judicial authority.

• They oversee revenue collection, law and order, and implementation of government schemes and policies.

• The position is distinct from the judiciary and falls under the executive branch of the government.

• Registrar General of the High Court:

• The Registrar General functions in the High Court and is responsible for administrative duties of the court, including personnel management and case records.

• This role does not pertain to district-level courts and is confined to the administrative hierarchy of the High Court.

• Important Points:

• District Judges exercise both original and appellate jurisdiction.

• The appointment and functioning of District Judges are governed by Article 233 of the Indian Constitution.

• They play a crucial role in ensuring justice at the grassroots level and act as a bridge between the subordinate courts and the High Court.

Q33. Answer: (c) 2002

The correct answer is 2002.

Key Points

• The National Seeds Policy was launched in the year 2002 by the Government of India.

• The policy aimed at increasing the availability of quality seeds to farmers and boosting agricultural productivity in the country.

• It emphasized the development of a strong seed industry in India to make the country self-reliant in seed production and supply.

• The policy covered various aspects such as seed production, certification, distribution, and quality control.

• It also focused on promoting the use of hybrid seeds and ensuring the conservation of genetic resources.

Additional Information

• Objectives of the National Seeds Policy, 2002:

• To ensure the availability of high-quality seeds and planting materials for agriculture, horticulture, and forestry.

• To promote the development and use of hybrid seeds for enhancing crop productivity.

• To encourage the participation of the private sector in seed production and distribution.

• To strengthen the seed testing and certification system in the country.

• To establish an efficient system for seed export and import to meet the demands of the farming community.

• Impact of the Policy:

• The policy helped in making India self-sufficient in seed production.

• It led to the development of a robust seed industry with both public and private sector involvement.

• Farmers gained access to high-yielding and disease-resistant seed varieties, contributing to increased agricultural productivity.

• Seed Certification:

• Seed certification was an essential aspect of the policy to ensure that farmers received genuine and high-quality seeds.

• The certification process involved rigorous testing for purity, germination rate, and quality.

• Role of the Private Sector:

• The policy encouraged private companies to invest in seed research and development.

• It facilitated collaboration between public and private sectors for the production and distribution of seeds.

Important Points

• Seed Replacement Rate (SRR):

• The National Seeds Policy aimed to increase the Seed Replacement Rate (SRR), which is the ratio of certified seeds used by farmers to the total seeds sown.

• A higher SRR ensures the use of better-quality seeds, leading to improved crop yields.

• Conservation of Genetic Resources:

• The policy emphasized the importance of conserving genetic diversity by maintaining a repository of indigenous and exotic germplasm.

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• It also aimed to protect farmers' rights and traditional knowledge.

• Role of ICAR:

• The Indian Council of Agricultural Research (ICAR) played a significant role in the implementation of the policy.

• It provided technical support for seed research and facilitated the development of new crop varieties.

Q34. Answer: (d) French sports goods retailer

The correct answer is French sports goods retailer.

Key Points

• Decathlon is a French multinational sports goods retailer known for providing high-quality products at affordable prices.

• It was founded in 1976 by Michel Leclercq in Lille, France. Since then, it has expanded to over 60 countries worldwide, including India.

• Decathlon entered the Indian market in 2009, setting up its first outlet in Bengaluru. It has since expanded its presence with outlets across major cities.

• The company specializes in designing, manufacturing, and retailing sports equipment and apparel for over 80 sports, ranging from cycling, running, swimming, and hiking to niche sports like archery and horse riding.

• Decathlon emphasizes a unique business model, combining in-house product development with direct-to-consumer sales to reduce costs and ensure quality.

Additional Information

• Decathlon's Global Expansion:

• Decathlon operates in Europe, Asia, Africa, and North America. It is one of the largest sporting goods retailers globally.

• The brand’s focus on research and innovation has led to the development of specialized products like Quechua hiking gear and Kipsta football equipment.

• Its expansion strategy includes establishing large-format stores and e-commerce platforms to cater to diverse customer bases.

• Decathlon's Indian Operations:

• Decathlon India was launched to promote a sports culture and encourage affordable access to sports equipment.

• The company has established over 80 outlets across India, located in cities like Bengaluru, Delhi, Mumbai, and Hyderabad.

• Decathlon India provides customized products to cater to specific needs of Indian consumers, such as cricket equipment and yoga accessories.

• Comparison of Options:

• Option 1 (Swedish sports goods retailer): Incorrect. Sweden is known for brands like IKEA and H&M, but Decathlon is not a Swedish company.

• Option 2 (German sports goods retailer): Incorrect. Germany is home to brands like Adidas and Puma; Decathlon originates from France.

• Option 3 (Chinese sports goods retailer): Incorrect. While China has numerous local sports brands, Decathlon is a French multinational company.

• Option 4 (French sports goods retailer): Correct. Decathlon was founded in France and is headquartered in Villeneuve-d'Ascq, France.

• Unique Features of Decathlon:

• Decathlon’s focus on affordable pricing and in-house production makes its products accessible to a wide range of customers.

• It offers an extensive range of sporting goods for professionals and beginners, catering to various age groups and skill levels.

• Decathlon invests heavily in R&D centers to ensure innovation and sustainability in its product offerings.

Important Points

• Customer Experience: Decathlon stores are designed to provide an interactive shopping experience, with product trials and live demonstrations.

• Sustainability: Decathlon is committed to environmental conservation, promoting eco-friendly products and practices.

• Digital Presence: The company has a strong e-commerce platform to cater to online shoppers in India and globally.

Q35. Answer: (c) Convergent and divergent boundaries

The correct answer is Convergent and divergent boundaries.

Key Points

• Volcanoes are commonly found at convergent plate boundaries: At these boundaries, one tectonic plate is subducted beneath another. The subducted plate melts due to intense heat and pressure, leading to magma formation. This magma rises to the Earth's surface, forming volcanoes. Example: The Pacific Ring of Fire is a prominent area of volcanic activity caused by convergent boundaries.

• Divergent plate boundaries also host volcanic activity: At divergent boundaries, tectonic plates move apart, creating gaps where

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magma from the mantle can rise and solidify. This process forms new crust and is associated with volcanic activity, particularly under oceans. Example: The Mid-Atlantic Ridge is a classic site of volcanic activity at divergent boundaries.

• Transform boundaries typically do not cause volcanic activity: At transform boundaries, plates slide past each other horizontally without significant magma formation. Hence, volcanoes are rarely associated with transform boundaries.

• Volcanoes are not restricted to plate boundaries: They can also occur at hotspots, which are areas of intense heat in the mantle that melt the crust to create volcanic activity. Example: The Hawaiian Islands are formed due to a hotspot and not at any plate boundary.

• Global distribution of volcanoes: Volcanoes are concentrated in areas where tectonic activity is prominent, such as subduction zones, rift zones, and hotspots. Approximately 75% of the world's volcanoes are found in the Pacific Ring of Fire.

Additional Information

• Convergent plate boundaries:

• These occur where plates move towards each other, causing subduction or collision.

• Subduction leads to intense pressure and heat, resulting in magma formation and volcanic activity.

• Example: The Andes mountain range in South America is formed due to subduction of the oceanic plate beneath the continental plate.

• Divergent plate boundaries:

• These occur where plates move apart, allowing magma to rise and form new crust.

• Volcanoes at divergent boundaries are typically less explosive compared to those at convergent boundaries.

• Example: The volcanic activity along the East African Rift Valley is due to divergent boundary processes.

• Transform plate boundaries:

• These occur where plates slide past each other horizontally.

• Volcanic activity is generally absent due to the lack of significant magma formation.

• Example: The San Andreas Fault in California is a famous transform boundary with no volcanic activity.

• Hotspots and intraplate volcanism:

• Hotspots are areas of mantle upwelling that cause volcanic activity away from plate boundaries.

• Example: Yellowstone National Park in the USA is a hotspot known for its geothermal activity and potential for large-scale volcanic eruptions.

• Hotspot volcanoes can form island chains as the tectonic plate moves over the stationary hotspot, creating sequential volcanic activity.

Important Points

• The Pacific Ring of Fire:

• Approximately 75% of the world's active volcanoes are located in this region.

• It includes subduction zones where oceanic plates sink beneath continental plates, causing frequent volcanic eruptions.

• Countries like Japan, Indonesia, and the Philippines are highly affected by volcanic activity in this area.

• Volcanic hazards:

• Volcanic eruptions can cause lava flows, pyroclastic flows, ashfall, and volcanic gases, posing risks to life and property.

• Monitoring and prediction of volcanic activity are critical for disaster management and mitigation.

• Organizations like the United States Geological Survey (USGS) and the Global Volcanism Program track global volcanic activity.

Q36. Answer: (d) Swarnim Bharat: Virasat aur Vikas

The correct answer is Swarnim Bharat: Virasat aur Vikas.

Key Points

• The theme Swarnim Bharat: Virasat aur Vikas reflects the vision of a progressive India that values its heritage while striving for development.

• The 76th Republic Day Parade, held on January 26, 2025, showcased India's rich cultural heritage and advancements in various fields such as technology, defense, and economy.

• This theme aimed to highlight the balance between preserving India's historical legacy and embracing modern innovations to build a developed nation.

• The parade included tableaux from various states and ministries, demonstrating the integration of India's traditional values with its aspirations for growth and progress.

• The theme also emphasized India's commitment to its roots, traditions, and the journey toward becoming a self-reliant and inclusive nation.

Additional Information

• Har Ghar Tiranga: Unity in Diversity:

• While this campaign was launched as part of the Azadi Ka Amrit Mahotsav initiative to encourage people to bring the national flag home, it was not the official theme for the 76th Republic Day Parade.

• It focused more on instilling a sense of pride and patriotism among citizens rather than showcasing the broader aspects of heritage and development.

• Digital Bharat: Future Forward:

• This theme represents India's push for digital transformation and innovation but was not the official theme for the Republic Day Parade in 2025.

• It highlights advancements in e-governance, digital infrastructure, and technology, aiming to make India a global leader in the digital domain.

• Viksit Bharat: Innovation & Inclusion:

• This theme aligns with India's vision for development through inclusivity and innovation, focusing on sectors like education, healthcare, and economic growth.

• However, it was not selected for the Republic Day Parade theme for 2025.

• Republic Day Parade Highlights:

• The Republic Day Parade is a significant occasion for showcasing India's military strength, cultural diversity, and achievements in various fields.

• It includes performances by school children, military personnel, and representations from different states and ministries in the form of tableaux.

• The event is attended by dignitaries, including the President of India, and often features a chief guest from a foreign nation.

Important Points

• Republic Day:

• January 26 marks the day when the Constitution of India came into effect in 1950, replacing the Government of India Act (1935).

• The Republic Day Parade is organized annually at Rajpath (now renamed Kartavya Path) in New Delhi.

• Significance of Themes:

• The themes for Republic Day are carefully chosen to reflect India's aspirations, achievements, and cultural ethos.

• The themes serve as a representation of India's progress and the vision for the future.

Q37. Answer: (b) Jataka story narratives

The correct answer is Jataka story narratives.

Key Points

• The carvings at the entrances of the Sanchi Stupa prominently depict Jataka story narratives, which are tales of the previous lives of Lord Buddha.

• These narratives serve as a medium to illustrate the moral teachings and the spiritual journey of Buddha in his earlier incarnations.

• The carvings highlight events such as Buddha's acts of sacrifice, compassion, and wisdom, which are central themes of Buddhist philosophy.

• The artistic style reflects the Mauryan and post-Mauryan era's craftsmanship, characterized by intricate detailing and symbolism.

• These carvings are instrumental in spreading Buddhist teachings and are an excellent example of how art was used as a storytelling medium in ancient India.

Additional Information

• Sanchi Stupa:

• The Sanchi Stupa is one of the oldest stone structures in India and is located in Madhya Pradesh.

• It was originally commissioned by Emperor Ashoka in the 3rd century BCE to house relics of Lord Buddha.

• The Great Stupa is surrounded by four intricately carved gateways or toranas, which depict various scenes from Buddha's life and Jataka tales.

• Jataka Tales:

• These are a collection of stories that narrate the previous lives of Buddha, where he appeared in various forms such as a king, animal, or common man.

• They emphasize moral lessons and virtues such as generosity, compassion, and wisdom.

• The tales are often used as didactic tools for teaching Buddhist philosophy and ethics.

• Artistic Features of Sanchi:

• The carvings are characterized by their narrative style, using visual storytelling rather than direct depiction of Buddha, as early Buddhist art avoided anthropomorphic representations.

• Symbols such as the lotus, wheel, and Bodhi tree are used to represent Buddha and his teachings.

• They reflect the transition from Mauryan art to the post-Mauryan period, showcasing advanced stone-carving techniques.

• Other Buddhist Sites:

• Similar carvings and Jataka story depictions can be found at sites like Ajanta Caves and Barabar Caves.

• These sites played a crucial role in the spread of Buddhism and its teachings across India and beyond.

Important Points

• Symbolism in Buddhist Art:

• Early Buddhist art used symbols such as the lotus flower (purity), wheel (dharma), and stupa (enlightenment) to represent Buddha.

• The absence of Buddha's anthropomorphic depiction reflects the Aniconic phase of Buddhist art.

• Historical Context:

• Emperor Ashoka, after embracing Buddhism, played a pivotal role in the construction of stupas and spreading Buddhist teachings.

• The Sanchi Stupa is a UNESCO World Heritage Site, recognized for its historical and architectural significance.

• Spread of Buddhism:

• Art and architecture, like the carvings at Sanchi, were essential tools for the dissemination of Buddhist philosophy.

• These visual representations made the teachings accessible to a wider audience, including those who were illiterate.

Q38. Answer: (c) China and Philippines

The correct answer is China and Philippines.

Key Points

• The South China Sea is a highly strategic and contentious maritime area, with several countries claiming overlapping territories.

• China has been asserting its claim over most of the South China Sea, citing its "Nine-Dash Line" policy, a position that has been widely criticized by international bodies and neighboring countries.

• The Philippines, which shares proximity to the South China Sea, has disputed China's territorial claims, particularly in areas like the Spratly Islands and Scarborough Shoal.

• Tensions between China and the Philippines renewed in 2025 due to activities such as the building of artificial islands, military deployment, and fishing rights violations.

• The dispute has prompted global concern over maritime security, freedom of navigation, and international trade routes in the region.

Additional Information

• South China Sea Overview:

• The South China Sea spans an area of approximately 3.5 million square kilometers and is bordered by countries such as China, the Philippines, Vietnam, Malaysia, Brunei, and Indonesia.

• It is home to critical shipping lanes, with nearly 30% of global maritime trade passing through its waters annually.

• Rich in resources, the region contains vast reserves of oil and natural gas, alongside significant fishing grounds.

• China’s Territorial Claims:

• China bases its claim on the "Nine-Dash Line," which encompasses about 90% of the South China Sea.

• In 2016, an arbitral tribunal in The Hague ruled against China's claims, favoring the Philippines in a case under the United Nations Convention on the Law of the Sea (UNCLOS), but China rejected the ruling.

• China has engaged in activities such as building artificial islands and deploying military bases to strengthen its presence.

• Philippines’ Position:

• The Philippines asserts sovereignty over areas like Scarborough Shoal and parts of the Spratly Islands, as recognized under international law.

• It has pursued diplomatic efforts and military partnerships, especially with the United States, to counter China's dominance.

• The country relies heavily on the South China Sea for fishing and trade, making the resolution of disputes critical to its economic stability.

• Global Implications:

• Tensions in the South China Sea affect international trade routes, as the region is central to Asia-Pacific economic activity.

• Countries like the United States have conducted freedom of navigation operations (FONOPs) to challenge excessive maritime claims and ensure open access.

• Regional organizations like ASEAN have been attempting to mediate disputes through dialogue and agreements such as the Code of Conduct (COC) in the South China Sea.

Important Points

• Historical Context:

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• Disputes in the South China Sea date back to the 20th century, with intensified claims emerging in the 1990s.

• In 2012, China took control of Scarborough Shoal after a standoff with the Philippines, heightening tensions.

• Legal Framework:

• The United Nations Convention on the Law of the Sea (UNCLOS) provides guidelines for resolving maritime disputes, defining concepts such as Exclusive Economic Zones (EEZs).

• Despite its adherence to UNCLOS, China has frequently disregarded rulings, leading to global criticism.

• Regional Cooperation:

• ASEAN has sought to establish a binding Code of Conduct to prevent conflicts in the South China Sea, though progress has been slow due to differing national interests.

Q39. Answer: (d) District

The correct answer is District.

Key Points

• The term 'Ahara' or 'Rashtra' during the Satavahana Empire referred to a district or administrative division. This system was used to organize and manage the empire effectively.

• The Satavahanas ruled large territories in the Deccan region, and to ensure efficient administration, they divided their empire into smaller units known as 'Ahara' or 'Rashtra', which were equivalent to districts.

• Each Ahara or Rashtra was under the control of an officer called the Amatya or Mahamatra, who was responsible for collecting taxes, maintaining law and order, and overseeing the administration.

• The system of administrative divisions ensured effective governance and allowed the Satavahana rulers to maintain control over their vast empire, which extended over large parts of present-day Maharashtra, Andhra Pradesh, Telangana, and Karnataka.

• This system of governance reflects the organized and decentralized administration adopted by ancient Indian empires to manage their territories efficiently.

Additional Information

• The Satavahana Empire:

• The Satavahana Empire was one of the most prominent dynasties in ancient India that ruled from the 1st century BCE to the 3rd century CE.

• Their empire primarily covered regions of the Deccan Plateau and extended into parts of central and southern India.

• The Satavahanas were known for their contributions to art, architecture, trade, and administration.

• Administrative Practices:

• The empire was divided into smaller administrative units like Ahara (district), Grama (village), and Janapada (province).

• Each administrative unit had designated officers who were responsible for its governance and maintenance of law and order.

• The officers also ensured the collection of taxes and facilitated trade and commerce within their jurisdiction.

• Other Terminologies:

• Amatya: These were officers responsible for the administration of the Ahara or Rashtra.

• Mahamatra: A higher-ranking officer, often responsible for overseeing multiple administrative divisions.

• Rajuka: Officials involved in judicial and administrative tasks at the local level.

• Taxation and Revenue:

• The Satavahanas had a well-organized system of taxation. Taxes were collected from agriculture, trade, and crafts.

• The revenue generated was used for the welfare of the people and for maintaining the army and infrastructure.

• Land revenue was the primary source of income, and it was often collected in the form of produce or currency.

• Key Features of Satavahana Rule:

• The Satavahanas promoted trade and commerce by establishing trade routes and supporting the merchant class.

• They issued coins made of lead, copper, and silver, which facilitated trade and strengthened their economy.

• Their art and architecture, such as the Amaravati Stupa, reflect their cultural and artistic achievements.

Q40. Answer: (d) Poshan Abhiyaan

The correct answer is Poshan Abhiyaan.

Key Points

• Poshan Abhiyaan, also known as the National Nutrition Mission, was launched by the Government of India on 8 March 2018, coinciding with International Women's Day.

• The initiative aims to address the issue of malnutrition among women, children, and adolescents by ensuring proper nutrition and healthcare facilities.

• It primarily focuses on reducing stunting, undernutrition, anemia (among young children and women), and low birth weight in

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babies, targeting children aged 0-6 years and pregnant women.

• The program utilizes technology-driven solutions, such as mobile apps and real-time monitoring systems, to track progress and ensure effective delivery of services.

• Under Poshan Abhiyaan, initiatives like Poshan Pakhwada and Rashtriya Poshan Maah are implemented annually to create awareness about nutrition and promote community participation.

Additional Information

• Features of Poshan Abhiyaan:

• The mission adopts a multi-ministerial approach involving ministries like Women and Child Development, Health, and Education.

• It is implemented in collaboration with state governments to ensure coverage across all districts in India.

• The program promotes behavioral change among communities through awareness campaigns, workshops, and training programs.

• Funds under Poshan Abhiyaan are shared between the Central Government and State Governments in a 60:40 ratio (90:10 for North-Eastern states and Himalayan states).

• The initiative incorporates the use of Anganwadi Workers and ASHA workers to directly engage with beneficiaries, ensuring last-mile delivery.

• Relevant Data:

• India has the highest number of malnourished children globally, with reports showing that 35.5% of children under the age of 5 years are stunted, as per the National Family Health Survey (NFHS-5) conducted in 2019-2021.

• The mission targets to reduce stunting to 25% by 2022, from the baseline of 38.4% recorded in the NFHS-4.

• It aims to reduce anemia among women and children by 3% annually and ensure 100% coverage of pregnant women with supplementary nutrition.

• Comparison with Other Schemes:

• Digital India: Focuses on digital empowerment of citizens and is unrelated to healthcare or nutrition.

• Beti Bachao, Beti Padhao: Aims to improve the sex ratio and promote education for girls but does not address healthcare and nutrition directly.

• Skill India Mission: Focuses on enhancing vocational skills for employment and is not related to nutrition or healthcare.

• Poshan Abhiyaan: Specifically targets nutrition and healthcare improvements for women and children, making it the most relevant initiative for the question.

• Global Context:

• The initiative aligns with the Sustainable Development Goals (SDG), particularly SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being).

• India's efforts under Poshan Abhiyaan contribute to global objectives of reducing malnutrition and improving health outcomes.

Important Points

• Poshan Abhiyaan involves the use of ICT-based real-time monitoring to ensure transparency and accountability in service delivery.

• The initiative complements existing schemes like the Integrated Child Development Services (ICDS) and Mid-Day Meal Scheme, amplifying their impact.

• Community participation through initiatives like Poshan Melas and Village Health and Nutrition Days enhances the program's outreach and effectiveness.

• The Jan Andolan aspect of Poshan Abhiyaan aims to make nutrition a people-centric movement, encouraging grassroots involvement.

Q41. Answer: (d) ab

Shortcut Trick

For a tower of height H, if the angles of elevation from two points at distances d1 and d2 from its base are complementary, the height is given directly by H = √(d1 × d2).

Given the distances from the base are d1 = b^2 m and d2 = a^2 m.

Applying the formula, height of the tower H = √(b^2 × a^2) = ab.

Therefore The correct answer is ab.

Alternate Method

X

Y

Top (T)

Base (B)

b^2 m

a^2 m

h

θ

90° - θ

Given:

Distance of point X from the base of the tower, XB = b^2 m

Distance of point Y from the base of the tower, YB = a^2 m

Let the height of the vertical tower TB be h.

The angles of elevation at X and Y are complementary. Let the angle at X be θ and the angle at Y be 90° − θ.

Formula Used:

In a right-angled triangle, tan(θ) = Perpendicular ÷ Base

Calculations:

In right-angled ΔTBX:

=> tan(θ) = TB ÷ XB

=> tan(θ) = h ÷ b^2 ... (Equation 1)

In right-angled ΔTBY:

=> tan(90° − θ) = TB ÷ YB

=> cot(θ) = h ÷ a^2 ... (Equation 2)

Multiplying Equation 1 and Equation 2:

=> tan(θ) × cot(θ) = (h ÷ b^2) × (h ÷ a^2)

=> 1 = h^2 ÷ (a^2 × b^2)

=> h^2 = a^2b^2

=> h = √(a^2b^2)

=> h = ab

Therefore The correct answer is ab.

Additional Information

Complementary Angles Property in Towers

When the angles of elevation of a tower from two points at distances x and y from its base are complementary, the height is always H = √(x × y).

Angles of Elevation and Depression

The angle of elevation is formed when looking up from the horizontal line of sight, while the angle of depression is formed when looking down. Both are alternate interior angles and are equal in magnitude.

Trigonometric Co-functions

For any angle θ, the tangent and cotangent functions are complementary values: tan(90° − θ) = cot(θ) and cot(90° − θ) = tan(θ).

Q42. Answer: (b) 318

Shortcut Trick

Solve mentally using the BODMAS rule directly:

Parentheses → (3 − 6) = −3

Multiplication → 9 × (−3) = −27

Curly braces → {30 − 27} = 3

Division → 954 ÷ 3 = 318

Therefore The correct answer is 318.

Alternate Method

Given:

Expression = [954 ÷ {30 + 9 × (3 − 6)}]

Concept Used:

BODMAS Rule: Brackets, Orders, Division, Multiplication, Addition, Subtraction.

Calculations:

=> [954 ÷ {30 + 9 × (3 − 6)}]

First, solve the inner parenthesis (3 − 6):

=> [954 ÷ {30 + 9 × (−3)}]

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Next, perform the multiplication inside the curly braces:

=> [954 ÷ {30 − 27}]

Now, perform the subtraction inside the curly braces:

=> [954 ÷ 3]

Finally, divide 954 by 3:

=> 318

Therefore The correct answer is 318.

Additional Information

BODMAS Rule

BODMAS stands for Brackets, Orders, Division, Multiplication, Addition, and Subtraction. It strictly dictates the left-to-right order of operations for solving mathematical expressions.

V-BODMAS Concept

An extension of BODMAS where 'V' stands for Vinculum (or bar). If a mathematical bar is present over an expression, that part must be evaluated before moving on to any brackets.

Bracket Solving Order

Nested brackets should always be solved from the innermost to the outermost boundary in this exact sequential order: small (), curly {}, and then square [].

Q43. Answer: (a) 39 hours

Shortcut Trick

Since the distance is constant, the ratio of time taken is inversely proportional to the ratio of speeds.

Ratio of speeds (Prashant : Nisha) = 117 : 48 = 39 : 16

Ratio of time (Prashant : Nisha) = 16 : 39

Given Prashant takes 16 hours, this precisely matches the 16 units of time.

Thus, the time taken by Nisha is 39 units = 39 hours.

Therefore The correct answer is 39 hours.

Alternate Method

Given:

Speed of Prashant = 117 km/hr

Time taken by Prashant = 16 hours

Speed of Nisha = 48 km/hr

Formula Used:

Distance = Speed × Time

Time = Distance ÷ Speed

Delhi

Kanpur

Prashant (117 km/hr, 16 hrs)

Nisha (48 km/hr, ? hrs)

Calculations:

=> Total distance from Delhi to Kanpur = 117 × 16

=> Total distance = 1872 km

=> Time taken by Nisha = Total distance ÷ Speed of Nisha

=> Time taken by Nisha = 1872 ÷ 48

=> Time taken by Nisha = 39 hours

Therefore The correct answer is 39 hours.

Additional Information

Relative Speed

When two bodies move in the same direction, Relative Speed = S1 − S2. When moving in opposite directions, Relative Speed = S1 + S2.

Average Speed

For equal distances covered at speeds S1 and S2, Average Speed = (2 × S1 × S2) ÷ (S1 + S2). For varying distances, Average Speed = Total Distance ÷ Total Time.

Unit Conversion

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

Q44. Answer: (c) Rs. 44,800

Shortcut Trick

Rate = 5% = 1/20. Let Principal = $(20)^2$ = 400 units.

1st year CI = 20 units, 2nd year CI = 20 + 1 = 21 units.

Given 2nd year CI = Rs. 2,352 => 21 units = 2352 => 1 unit = 112.

Principal = 400 × 112 = Rs. 44,800.

Therefore The correct answer is Rs. 44,800.

Alternate Method

Given:

Rate of Interest (R) = 5% per annum

Compound Interest for 2nd year (I2) = Rs. 2,352

Principal (P)

1st Year CI (I1)

5% of P

2nd Year CI (I2)

Rs. 2,352

I2 = I1 × 1.05

Formula Used:

Interest for 2nd year = Interest for 1st year + Interest on 1st year's interest

Simple Interest for 1st year = (Principal × Rate × Time) ÷ 100

Calculations:

=> Let I1 be the interest for the first year.

=> I2 = I1 + (5% of I1) = 1.05 × I1

=> 1.05 × I1 = 2352

=> I1 = 2352 ÷ 1.05 = Rs. 2,240

=> Since 1st year interest is 5% of the Principal (P):

=> 5% of P = 2240

=> P × (5 ÷ 100) = 2240

=> P = 2240 × 20 = Rs. 44,800

Therefore The correct answer is Rs. 44,800.

Additional Information

Effective Rate of Compound Interest

For 2 years at R% per annum, the effective compound interest rate is $(2R + R^2/100)$% of the principal.

Difference between CI and SI

For 2 years, the difference between Compound Interest and Simple Interest is exactly the interest earned on the 1st year's interest, which equals $P(R/100)^2$.

Multiplicative Factor Method

Amount after n years under CI is calculated as $A = P(1 + R/100)^n$. The factor (1 + R/100) multiplies the previous year's amount directly.

Q45. Answer: (d) 720

Shortcut Trick

Check if the given sides form a Pythagorean triplet: $80^2 + 18^2 = 6400 + 324 = 6724$.

Since $82^2 = 6724$, it satisfies the Pythagorean theorem, meaning it is a right-angled triangle.

The hypotenuse is the longest side (82 cm), making the base and height 18 cm and 80 cm.

Area = (1 ÷ 2) × Base × Height

Area = (1 ÷ 2) × 18 × 80 = 720 cm^2.

Therefore The correct answer is 720 cm^2.

Alternate Method

Given:

The sides of the triangle are a = 82 cm, b = 18 cm, and c = 80 cm.

80 cm

18 cm

82 cm

Formula Used:

Heron's formula for the area of a triangle: Area = √(s × (s − a) × (s − b) × (s − c))

Where 's' is the semi-perimeter: s = (a + b + c) ÷ 2

Calculations:

=> s = (82 + 18 + 80) ÷ 2

=> s = 180 ÷ 2 = 90 cm

=> Area = √(90 × (90 − 82) × (90 − 18) × (90 − 80))

=> Area = √(90 × 8 × 72 × 10)

=> Area = √(720 × 720)

=> Area = 720 cm²

Therefore The correct answer is 720 cm².

Additional Information

Right-Angled Triangle

A triangle in which one angle is exactly 90°. The sides follow the Pythagorean theorem: a² + b² = c², and its Area = (1 ÷ 2) × Base × Height.

Heron's Formula

Used to find the area of any general triangle when all three sides are known. Area = √(s(s − a)(s − b)(s − c)), where s is the semi-perimeter.

Equilateral Triangle

A triangle with all three sides equal. Its Area = (√3 ÷ 4) × a², where a is the side length.

Q46. Answer: (d) 39.25

Shortcut Trick

Value 1 = 65% of 65 = (65 × 65) ÷ 100 = 4225 ÷ 100 = 42.25

Value 2 = (1 ÷ 5) of 15 = 3

Required difference = 42.25 − 3 = 39.25

Therefore The correct answer is 39.25.

Alternate Method

Given:

First expression: 65% of 65

Second expression: (1 ÷ 5) of 15

Calculations:

=> Value of first expression = (65 ÷ 100) × 65

=> Value of first expression = 4225 ÷ 100 = 42.25

=> Value of second expression = (1 ÷ 5) × 15 = 15 ÷ 5 = 3

=> Required difference = Value of first expression − Value of second expression

=> Required difference = 42.25 − 3 = 39.25

Therefore The correct answer is 39.25.

Additional Information

BODMAS Rule

BODMAS specifies the order of operations: Brackets, Order (powers/roots and 'of'), Division, Multiplication, Addition, and Subtraction. The word 'of' is treated as multiplication but solved before standard division and multiplication.

Squaring Numbers Ending in 5

To square any two-digit number ending in 5 (e.g., 65), multiply the tens digit by the next consecutive integer (6 × 7 = 42) and append 25 at the end to get 4225.

Percentage to Fraction

To evaluate a percentage expression, convert the percentage into a fraction by dividing by 100. Thus, 65% is equivalent to 65 ÷ 100.

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Q47. Answer: (a) (35)/(2)

Shortcut Trick

Total work = LCM(30, 21, 14) = 210 units.

Efficiency: Jaya = 7, Jaya + Sushma = 10, Jaya + Sushma + Hina = 15.

Efficiency of Hina = (Jaya + Sushma + Hina) − (Jaya + Sushma) = 15 − 10 = 5 units/day.

Combined efficiency of Jaya and Hina = 7 + 5 = 12 units/day.

Time taken by Jaya and Hina = 210 ÷ 12 = 35/2 days.

Therefore The correct answer is 35/2 days.

Alternate Method

Given:

Time taken by Jaya = 30 days

Time taken by Jaya and Sushma = 21 days

Time taken by Jaya, Sushma, and Hina = 14 days

Formula Used:

Total Work = Efficiency × Time

Person	Days	Total Work	Efficiency
Jaya	30	210	210 ÷ 30 = 7
Jaya + Sushma	21	210 ÷ 21 = 10	
Jaya + Sushma + Hina	14	210 ÷ 14 = 15	

Calculations:

=> Efficiency of Jaya = 7 units/day

=> Efficiency of Jaya + Sushma = 10 units/day

=> Efficiency of Jaya + Sushma + Hina = 15 units/day

=> Efficiency of Hina = Efficiency of (Jaya + Sushma + Hina) − Efficiency of (Jaya + Sushma)

=> Efficiency of Hina = 15 − 10 = 5 units/day

=> Combined efficiency of Jaya and Hina = Efficiency of Jaya + Efficiency of Hina

=> Combined efficiency of Jaya and Hina = 7 + 5 = 12 units/day

=> Time taken by Jaya and Hina = Total Work ÷ Combined Efficiency

=> Time taken by Jaya and Hina = 210 ÷ 12 = 35/2 days

Therefore The correct answer is 35/2 days.

Additional Information

Pipes & Cisterns

Similar to Time & Work, filling pipes have positive efficiency while emptying pipes have negative efficiency. The total capacity of the tank acts as the Total Work.

Work & Wages

Wages are always distributed in the direct ratio of the total work done by individuals. If they work together for the same number of days, wages are directly proportional to their efficiencies.

Alternate Day Work

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

Q48. Answer: (c) Rs. 4,275

Shortcut Trick

Successive discounts can be applied directly using multiplying factors.

Final SP = MP × (100 − D1) / 100 × (100 − D2) / 100

Final SP = 5000 × (90 / 100) × (95 / 100)

Final SP = 50 × 9 × 9.5 = 4275

Therefore The correct answer is Rs. 4,275.

Alternate Method

Given:

Marked Price (MP) = Rs. 5,000

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Successive Discounts: a = 10%, b = 5%

Formula Used:

Effective Single Discount % = a + b − (a × b) / 100

Selling Price (SP) = MP − Discount Amount

MP = 5000

−10%

4500

−5%

SP = 4275

Effective Discount = 14.5%

Calculations:

=> Effective Single Discount = 10 + 5 − (10 × 5) / 100

=> Effective Discount = 15 − 0.5 = 14.5%

=> Discount Value = 14.5% of 5000

=> Discount Value = (14.5 / 100) × 5000 = 725

=> Selling Price = 5000 − 725 = 4275

Therefore The correct answer is Rs. 4,275.

Additional Information

Marked Price & Discount

Discount is always given on the Marked Price (MP) of an article. The selling price is calculated as SP = MP − Discount.

Successive Discount Rule

When two consecutive discounts d1% and d2% are offered, the overall effective discount is calculated using the formula: d1 + d2 − (d1 × d2) / 100.

Direct CP to MP Relation

A common and highly useful relation to connect Cost Price (CP) and Marked Price (MP) is: MP × (100 − Discount%) = CP × (100 + Profit%).

Q49. Answer: (d) Rs. 73,600

Shortcut Trick

M's Profit = (1359 + 453) ÷ 2 = Rs. 906 and N's Profit = 1359 − 906 = Rs. 453.

Profit Ratio (M : N) = 906 : 453 = 2 : 1.

Capital Ratio = (Profit_M ÷ Time_M) : (Profit_N ÷ Time_N) = (2 ÷ 3) : (1 ÷ 4) = 8 : 3.

Difference in parts = 8 − 3 = 5 parts = Rs. 46,000 => 1 part = Rs. 9,200.

Capital of M = 8 parts = 8 × 9200 = Rs. 73,600.

Therefore The correct answer is Rs. 73,600.

Alternate Method

Given:

Total profit = Rs. 1,359

M's profit − N's profit = Rs. 453

M's time = 3 months, N's time = 4 months

M's capital − N's capital = Rs. 46,000

Formula Used:

Profit Ratio = (Capital1 × Time1) : (Capital2 × Time2)

Partner M

Capital: x + 46000

Time: 3 months

Profit: Rs. 906

Partner N

Capital: x

Time: 4 months

Profit: Rs. 453

Capital & Time Distribution

Calculations:

=> M's profit + N's profit = 1359

=> M's profit − N's profit = 453

=> Adding the above two equations: 2 × M's profit = 1812

=> M's profit = 906

=> N's profit = 1359 − 906 = 453

=> Profit ratio of M to N = 906 : 453 = 2 : 1

=> Let N's capital be x. Then M's capital is x + 46000.

=> [(x + 46000) × 3] ÷ [x × 4] = 2 ÷ 1

=> 3x + 138000 = 8x

=> 5x = 138000

=> x = 27600

=> M's capital = x + 46000 = 27600 + 46000 = 73600

Therefore The correct answer is Rs. 73,600.

Additional Information

Profit Sharing Ratio in Partnership

When partners invest varying capital amounts for different time periods, the profit is shared in the ratio of the product of their capital and time period: Profit Ratio = (C1 × T1) : (C2 × T2).

Active vs Sleeping Partner

An active partner actively manages the business and frequently gets a salary or commission before the profit division, whereas a sleeping partner solely contributes capital and earns a share of the remaining profits based on their investment.

Equivalent Capital

To simplify complex partnerships, the overall investment is converted into equivalent capital for a standard unit of time (generally 1 month) by multiplying the invested principal amount with the corresponding number of months.

Q50. Answer: (a) 60

Shortcut Trick

The mean proportional between two numbers a and b is given directly by √(a × b).

Mean proportional = √(24 × 150)

=> Mean proportional = √3600

=> 60

Therefore The correct answer is 60.

Alternate Method

Given:

The two given numbers are 24 and 150.

Formula Used:

If x is the mean proportional between two numbers a and b, then they are in continued proportion such that a : x = x : b, which implies $x^2 = a \times b$.

Mean Proportional Concept

a = 24

b = 150

24 : x = x : 150

x = √(24 × 150)

x = 60

Calculations:

Let the mean proportional be x.

=> 24 : x = x : 150

=> 24 ÷ x = x ÷ 150

=> $x^2 = 24 \times 150$

=> $x^2 = 3600$

=> x = √3600

=> x = 60

Therefore The correct answer is 60.

Additional Information

Mean Proportional

For any two positive numbers a and b, the mean proportional x satisfies a : x = x : b, resulting in the rule x = √(a × b).

Third Proportional

If three numbers a, b, and c are in continued proportion (a : b = b : c), then c is called the third proportional. The formula used is c = b^2 ÷ a.

Fourth Proportional

If four numbers a, b, c, and d are in proportion (a : b = c : d), then d is known as the fourth proportional. The formula used is d = (b × c) ÷ a.

Compound Ratio

The compound ratio of two different ratios a : b and c : d is the product of their respective antecedents and consequents, calculated directly as (a × c) : (b × d).

Q51. Answer: (b) 12:30 PM

Shortcut Trick

Time taken by Train A = 7 hours, and by Train B = 5 hours.

Let Total Distance = LCM of 7 and 5 = 35 units.

Speed of Train A = 5 units/hr, Speed of Train B = 7 units/hr.

Distance covered by Train A in 2 hours (8:25 AM to 10:25 AM) = 2 × 5 = 10 units.

Remaining distance = 25 units. Relative speed = 5 + 7 = 12 units/hr.

Time to meet = 25 ÷ 12 = 2 hours 5 minutes. Meeting Time = 10:25 AM + 2 hours 5 minutes = 12:30 PM.

Therefore The correct answer is 12:30 PM.

Alternate Method

Given:

Train A start time = 8:25 AM, arrival time = 3:25 PM

Train B start time = 10:25 AM, arrival time = 3:25 PM

Formula Used:

Speed = Distance ÷ Time

Relative Speed (Opposite Directions) = S1 + S2

Station M

Train A

8:25 AM

Station N

Train B

10:25 AM

A at 10:25 AM

10 km

Remaining: 25 km

Meeting Point

Calculations:

=> Total journey time for Train A = 3:25 PM − 8:25 AM = 7 hours

=> Total journey time for Train B = 3:25 PM − 10:25 AM = 5 hours

=> Let the total distance between M and N be the LCM of 7 and 5 = 35 km

=> Speed of Train A = 35 ÷ 7 = 5 km/h

=> Speed of Train B = 35 ÷ 5 = 7 km/h

=> Train A starts 2 hours earlier than Train B (from 8:25 AM to 10:25 AM).

=> Distance covered by Train A in these 2 hours = 5 × 2 = 10 km

=> Remaining distance to be covered together = 35 − 10 = 25 km

=> Relative speed of both trains = 5 + 7 = 12 km/h

=> Time taken to meet after 10:25 AM = Distance ÷ Relative speed = 25 ÷ 12 hours

=> 25 ÷ 12 hours = 2 hours and (1/12) × 60 minutes = 2 hours 5 minutes

=> Meeting time = 10:25 AM + 2 hours 5 minutes = 12:30 PM

Therefore The correct answer is 12:30 PM.

Additional Information

Relative Speed (Opposite Direction)

When two objects move towards each other, their relative speed is the sum of their individual speeds: S_R = S1 + S2.

Relative Speed (Same Direction)

When two objects move in the same direction, their relative speed is the difference between their individual speeds: S_R = S1 − S2.

Average Speed

If an object covers equal distances at different speeds S1 and S2, the overall average speed is calculated as (2 × S1 × S2) ÷ (S1 + S2).

Q52. Answer: (c) 3

Shortcut Trick

Divisibility rule of 3: A number is divisible by 3 if the sum of its digits is a multiple of 3.

Sum of digits of 327087 = 3 + 2 + 7 + 0 + 8 + 7 = 27

Since 27 is divisible by 3, the given number 327087 is perfectly divisible by 3.

Therefore The correct answer is 3.

Alternate Method

Given:

Number = 327087

Checking the given options:

=> Option 1 (5): A number is divisible by 5 if its last digit is 0 or 5. Here, the last digit is 7, so it is not divisible by 5.

=> Option 2 (8): A number is divisible by 8 if its last three digits are divisible by 8. The last three digits are 087, which is not perfectly divisible by 8.

=> Option 4 (12): A number must be divisible by both 4 and 3 to be divisible by 12. Since the last digit (7) is odd, the number is not divisible by 4, and hence not divisible by 12.

=> Option 3 (3): A number is divisible by 3 if the sum of its digits is divisible by 3.

=> Sum of digits = 3 + 2 + 7 + 0 + 8 + 7 = 27

=> 27 is perfectly divisible by 3 (27 ÷ 3 = 9).

Therefore The correct answer is 3.

Additional Information

Divisibility Rule of 4

A number is divisible by 4 if the number formed by its last two digits is divisible by 4.

Divisibility Rule of 9

A number is divisible by 9 if the sum of its digits is perfectly divisible by 9.

Divisibility Rule of 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.

Q53. Answer: (b) 4

Shortcut Trick

The greatest number leaving the same remainder is the HCF of the differences between the given numbers.

Given numbers are 49, 97, and 189.

Differences = |97 − 49|, |189 − 97|, and |189 − 49|.

The differences are 48, 92, and 140.

HCF(48, 92, 140) = 4.

Therefore The correct answer is 4.

Alternate Method

Given:

The numbers are 49, 97, and 189.

Formula Used:

Required Number = HCF of (y − x), (z − y), and (z − x) where x < y < z.

Calculation:

=> Let x = 49, y = 97, and z = 189

=> y − x = 97 − 49 = 48

=> z − y = 189 − 97 = 92

=> z − x = 189 − 49 = 140

=> Now, we need to find the highest common factor (HCF) of 48, 92, and 140.

=> Prime factorization of 48 = 24 × 3

=> Prime factorization of 92 = 22 × 23

=> Prime factorization of 140 = 22 × 5 × 7

=> The common prime factor with the lowest power is 22.

=> HCF = 22 = 4

Therefore The correct answer is 4.

Additional Information

HCF for Same Remainder

When a number divides x, y, and z leaving the same remainder, the greatest such number is the HCF of the absolute differences: |x − y|, |y − z|, and |z − x|.

HCF for Specific Remainders

When a number divides x, y, and z leaving specific remainders a, b, and c respectively, the greatest such number is the HCF of (x − a), (y − b), and (z − c).

LCM with Specific Remainder

The smallest number which when divided by x, y, and z leaves the same remainder r in each case is obtained by finding LCM(x, y, z) + r.

Q54. Answer: (b) - 138x + 127

Shortcut Trick

Multiply out the first and second bracket terms directly.

=> $(7x^2 − 75x + 36) − (7x^2 + 63x − 91)$

=> The x^2 terms cancel out: $7x^2 − 7x^2 = 0$

=> Collect x terms and constants: $−75x − 63x + 36 + 91 = −138x + 127$

Therefore The correct answer is −138x + 127.

Alternate Method

Given:

Expression: $3((7/3)x^2 − 25x + 12) − 7(x^2 + 9x − 13)$

Calculation:

=> Expand the first term by multiplying each element by 3:

=> $3 × (7/3)x^2 − 3 × 25x + 3 × 12 = 7x^2 − 75x + 36$

=> Expand the second term by multiplying each element by 7:

=> $7 × x^2 + 7 × 9x − 7 × 13 = 7x^2 + 63x − 91$

=> Subtract the second expanded expression from the first:

=> $7x^2 − 75x + 36 − (7x^2 + 63x − 91)$

=> $7x^2 − 75x + 36 − 7x^2 − 63x + 91$

=> Group the like terms together:

=> $(7 − 7)x^2 + (−75 − 63)x + (36 + 91)$

=> $0x^2 − 138x + 127$

=> −138x + 127

Therefore The correct answer is −138x + 127.

Additional Information

BODMAS Rule

Simplification of algebraic expressions follows the BODMAS rule: Brackets, Orders (powers/roots), Division, Multiplication, Addition, and Subtraction, resolved from left to right.

Distributive Property

The rule states that a(b + c) = ab + ac. It allows you to multiply a sum or difference by multiplying each addend separately and then bringing them together.

Like Terms

Only terms that have identical variable parts (like x, x^2, xy) can be added or subtracted to simplify the expression.

Q55. Answer: (d) 75% loss

Shortcut Trick

Given, SP of 20 books = CP of 5 books

=> 20 × SP = 5 × CP

=> SP ÷ CP = 1 ÷ 4

Loss = CP − SP = 4 − 1 = 3 units

Loss % = (3 ÷ 4) × 100 = 75%

Therefore The correct answer is 75% loss.

Alternate Method

Given:

Selling price of 20 books = Cost price of 5 books

Formula Used:

Loss = CP − SP

Loss % = (Loss ÷ CP) × 100

Cost Price (CP) = 4 units

SP = 1 unit

Loss = 3 units

Loss % = (3 ÷ 4) × 100 = 75%

Calculations:

Let SP be the selling price of 1 book and CP be the cost price of 1 book.

=> 20 × SP = 5 × CP

=> SP ÷ CP = 5 ÷ 20 = 1 ÷ 4

=> Let SP = 1 unit and CP = 4 units.

=> Loss = 4 − 1 = 3 units

=> Loss % = (3 ÷ 4) × 100

=> Loss % = 75%

Therefore The correct answer is 75% loss.

Additional Information

Cost Price (CP) & Selling Price (SP)

CP is the price at which goods are bought. SP is the price at which goods are sold. Profit or loss is always calculated on the CP unless specifically stated otherwise.

Profit & Loss Formulas

Profit = SP − CP and Profit % = (Profit ÷ CP) × 100. Loss = CP − SP and Loss % = (Loss ÷ CP) × 100.

Marked Price (MP) & Discount

Discount is an allowance given on the Marked Price (MP) of an article. Discount = MP − SP. Discount % = (Discount ÷ MP) × 100.

Q56. Answer: (a) (4)/(9)

Shortcut Trick

Total Work = LCM(12, 18) = 36 units.

Efficiency of A = 3 units/day, Efficiency of B = 2 units/day.

Combined work in 4 days = (3 + 2) × 4 = 20 units.

Remaining work = 36 − 20 = 16 units.

Fraction of work left = 16/36 = 4/9.

Therefore The correct answer is 4/9.

Alternate Method

Given:

=> Time taken by A to complete the work = 12 days

=> Time taken by B to complete the work = 18 days

Formula Used:

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=> Total Work = LCM of given days

=> Efficiency = Total Work ÷ Time

Person	Days	Total Work	Efficiency
A	12	36	3
B	18	2	

Calculations:

=> Total efficiency of (A + B) = 3 + 2 = 5 units/day.

=> Work completed by A and B working together for 4 days = 5 × 4 = 20 units.

=> Remaining work = Total Work − Completed Work = 36 − 20 = 16 units.

=> Fraction of work left = Remaining work ÷ Total Work = 16 ÷ 36 = 4/9.

Therefore The correct answer is 4/9.

Additional Information

Total Work Formula

Total Work = Time Taken × Efficiency. Efficiency is defined as the work done per unit time.

Combined Work Concept

If person A can do a work in X days and person B can do it in Y days, their combined 1 day work is equal to 1/X + 1/Y.

Work and Wages

If workers complete a job together, the wages are divided in the ratio of the total work done by each individual.

Pipes and Cisterns

This topic follows the same principles as Time and Work, but note that outlet (emptying) pipes have a negative efficiency.

Q57. Answer: (c) 132º

Shortcut Trick

In ΔABC, angle BCA = 180º − (137º + 19º) = 24º.

Since BC || AD, the alternate interior angles are equal => angle CAD = angle BCA = 24º.

In ΔACD, given AC = CD, angles opposite to equal sides are equal => angle CDA = angle CAD = 24º.

Finally, angle ACD = 180º − (24º + 24º) = 132º.

Therefore The correct answer is 132º.

Alternate Method

Given:

ABCD is a trapezium with BC || AD.

AC = CD

angle ABC = 19º and angle BAC = 137º

A

B

C

D

19º

137º

24º

24º

24º

132º

Calculations:

In ΔABC, the sum of all internal angles is 180º.

=> angle ABC + angle BAC + angle BCA = 180º

=> 19º + 137º + angle BCA = 180º

=> 156º + angle BCA = 180º

=> angle BCA = 180º − 156º = 24º

Since BC || AD, the alternate interior angles are equal.

=> angle CAD = angle BCA = 24º

Now, consider ΔACD. It is given that AC = CD.

Angles opposite to equal sides of a triangle are equal.

=> angle CDA = angle CAD = 24º

The sum of all internal angles in ΔACD is 180º.

=> angle ACD + angle CAD + angle CDA = 180º

=> angle ACD + 24º + 24º = 180º

=> angle ACD + 48º = 180º

=> angle ACD = 180º − 48º = 132º

Therefore The correct answer is 132º.

Additional Information

Properties of Trapezium

A trapezium is a quadrilateral with at least one pair of parallel sides. The adjacent angles along the non-parallel sides sum up to 180º.

Alternate Interior Angles

When a transversal line intersects two parallel lines, the alternate interior angles formed on opposite sides of the transversal are equal.

Isosceles Triangle Properties

A triangle with two equal side lengths is called an isosceles triangle. The interior angles opposite to these equal sides are also strictly equal to each other.

Q58. Answer: (b) M - N = 2

Shortcut Trick

For divisibility by 11, difference of sum of alternate digits must be 0 or a multiple of 11.

Sum of odd placed digits = N + 3 + 9 = N + 12

Sum of even placed digits = 8 + M + 2 = M + 10

Equating their difference to 0: (M + 10) − (N + 12) = 0

=> M − N − 2 = 0 => M − N = 2

Therefore The correct answer is M − N = 2.

Alternate Method

Given:

6-digit number: N83M92

The number is divisible by 11.

Formula Used:

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

Calculation:

=> Sum of digits at odd places (from left) = N + 3 + 9 = N + 12

=> Sum of digits at even places (from left) = 8 + M + 2 = M + 10

=> Difference = (N + 12) − (M + 10)

=> Difference = N − M + 2

=> For the number to be divisible by 11, the difference must be equal to 0, 11, −11, etc.

=> Case 1: N − M + 2 = 0

=> M − N = 2 (This option is available)

=> Case 2: N − M + 2 = 11

=> N − M = 9 (This option is not available)

Therefore The correct answer is M − N = 2.

Additional Information

Divisibility Rule for 3 and 9

A number is divisible by 3 or 9 if the sum of all its digits is completely divisible by 3 or 9, respectively.

Divisibility Rule for 4 and 8

A number is divisible by 4 if its last 2 digits form a number divisible by 4. It is completely divisible by 8 if its last 3 digits form a number divisible by 8.

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Combined Divisibility Rule for 7, 11 and 13

For any large number, if the difference between the number formed by its last 3 digits and the remaining digits is a multiple of 7, 11, or 13, then the entire number is divisible by 7, 11, or 13 respectively.

Q59. Answer: (d) Rs. 4,375

Shortcut Trick

No profit or loss means the Selling Price (SP) is equal to the Cost Price (CP) = Rs. 3,500.

A discount of 20% means the SP is exactly 80% of the Marked Price (MP).

80% of MP = Rs. 3,500 => MP = 3500 ÷ 0.8 = Rs. 4,375.

Therefore The correct answer is Rs. 4,375.

Alternate Method

Given:

Cost Price (CP) = Rs. 3,500

Discount = 20%

Profit/Loss = Nil

Formula Used:

Selling Price (SP) = CP + Profit (or − Loss)

MP = (SP × 100) ÷ (100 − Discount%)

Marked Price

(MP = 100%)

Selling Price

(SP = Rs. 3500)

−20% Discount

80% of MP = Rs. 3500

Calculations:

=> Since there is no profit or loss, the shopkeeper sells the bicycle exactly at the Cost Price.

=> Selling Price (SP) = CP = Rs. 3,500

=> We know that SP is calculated after allowing a discount on the Marked Price (MP).

=> SP = MP − (20% of MP) = 80% of MP

=> 80% of MP = 3500

=> (80 ÷ 100) × MP = 3500

=> MP = (3500 × 100) ÷ 80

=> MP = 350000 ÷ 80

=> MP = Rs. 4,375

Therefore The correct answer is Rs. 4,375.

Additional Information

Marked Price & Discount

Discount is always offered strictly on the Marked Price (MP). The formula to find the Selling Price is SP = MP − Discount, which can also be written as SP = MP × (100 − Discount%) ÷ 100.

No Profit No Loss Concept

This situation typically occurs when the total selling price of goods exactly matches the total cost price (i.e., SP = CP). As a result, both Net Profit and Net Loss equal zero.

Direct Relation Between CP and MP

The ratio of Marked Price to Cost Price can be directly derived using the formula: MP ÷ CP = (100 + Profit%) ÷ (100 − Discount%). In the case of no profit, simply use Profit% = 0.

Q60. Answer: (c) 79

Shortcut Trick

Given expression: $10^2 + \sqrt{(2^2)} - 4\sqrt{25} - 3$

Directly evaluate powers and square roots first:

= 100 + 2 − (4 × 5) − 3

= 102 − 20 − 3 = 79

Therefore The correct answer is 79.

Alternate Method

Given:

Expression: $10^2 + \sqrt{(2^2)} - 4\sqrt{25} - 3$

Formula Used:

BODMAS Rule (Brackets, Orders, Division, Multiplication, Addition, Subtraction)

Calculations:

Solving the orders (powers and roots) first:

=> 100 + 2 − 4 × 5 − 3

Solving multiplication next:

=> 100 + 2 − 20 − 3

Solving addition from left to right:

=> 102 − 20 − 3

Solving subtraction successively:

=> 82 − 3

=> 79

Therefore The correct answer is 79.

Additional Information

BODMAS Rule

BODMAS determines the sequence of operations for mathematical expressions: Brackets, Orders (powers/roots), Division, Multiplication, Addition, and Subtraction.

Square Roots

The square root of a perfect square is an integer. For example, √25 = 5. Moreover, taking the square root of a squared positive number results in the number itself: $\sqrt{(x^2)} = x$.

Exponents

An exponent indicates how many times a base number is multiplied by itself. For example, 10^2 means 10 × 10 = 100.

Q61. Answer: (c) 48 cm2

Shortcut Trick

For any triangle with a given base and height, the area is directly calculated as half of their product.

Area = (Base × Height) ÷ 2

Area = (12 × 8) ÷ 2 = 96 ÷ 2 = 48 cm².

Therefore The correct answer is 48 cm².

Alternate Method

A

B

C

Base = 12 cm

Height = 8 cm

Given:

Base of the triangle (b) = 12 cm

Height of the triangle (h) = 8 cm

Formula Used:

Area of a triangle = 1/2 × Base × Height

Calculation:

=> Area = 1/2 × 12 × 8

=> Area = 6 × 8

=> Area = 48 cm²

Therefore The correct answer is 48 cm².

Additional Information

Area of an Equilateral Triangle

For a triangle with all three sides equal (side = a), the area is calculated using the formula: Area = (√3 ÷ 4) × a².

Heron's Formula for Scalene Triangles

When all three sides (a, b, c) of a triangle are known, Area = √[s(s−a)(s−b)(s−c)], where the semi-perimeter s = (a + b + c) ÷ 2.

Right-Angled Triangle Area

If the triangle contains a 90° angle, the area is simply half the product of the legs forming the right angle: Area = 1/2 × Base × Perpendicular.

Q62. Answer: (d) 21

Shortcut Trick

Let the present ages of the father and son be F and S. We need to find 'x' years from now when F + x = 2(S + x), which simplifies to x = F − 2S.

From the condition 3 years ago: F − 3 = 2(S − 3) + 24.

Simplifying this directly gives: F − 2S = 21.

Since x = F − 2S, the required number of years 'x' is exactly 21.

Therefore The correct answer is 21 years.

Alternate Method

3 Years Ago

Present

x Years Hence

F − 3 = 2(S − 3) + 24

F − 2S = 21

Ages: F, S

F + x = 2(S + x)

x = F − 2S

Substitute to get x = 21

Given:

Three years ago, the father was 24 years older than twice his son's age.

Let the present age of the Father be F and the Son be S.

Formula Used:

Age x years ago = Present Age − x

Age x years hence = Present Age + x

Calculations:

Father's age 3 years ago = F − 3

Son's age 3 years ago = S − 3

According to the given past condition:

=> F − 3 = 2 × (S − 3) + 24

=> F − 3 = 2S − 6 + 24

=> F − 3 = 2S + 18

=> F − 2S = 21 ... (Equation 1)

Let after 'x' years, the Father's age be twice the Son's age.

=> Father's future age = F + x

=> Son's future age = S + x

According to the required condition:

=> F + x = 2 × (S + x)

=> F + x = 2S + 2x

=> x = F − 2S

Substitute the value of (F − 2S) from Equation 1:

=> x = 21

Therefore The correct answer is 21 years.

Additional Information

Age Timeline Principle

If the present age is P, then age 'n' years ago is (P − n) and age 'n' years hence is (P + n). Always base equations on the present ages to seamlessly connect different timelines.

Constant Difference Rule

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The age difference between two individuals remains constant throughout their lifetime. If a father is 30 years older than his son today, he will remain 30 years older even 50 years later.

Linear Equations in Ages

Even when variables like individual ages cannot be uniquely determined, composite values (like F − 2S) can evaluate exactly to solve for a specific timeline shift, making it a system of dependent equations.

Q63. Answer: (d) Rs. 70

Shortcut Trick

Let original cost of a pen be x and a pencil be y.

Given equations: 12x + 7y = 285 and 11(x − 6) + 3(y + 5) = 118 => 11x + 3y = 169

Using cross-multiplication: x = (285 × 3 − 169 × 7) ÷ (12 × 3 − 11 × 7) = −328 ÷ −41 = 8

Substituting x in the second equation: 11 × 8 + 3y = 169 => 3y = 81 => y = 27

Original cost of 2 pens + 2 pencils = 2 × (8 + 27) = 2 × 35 = 70

Therefore The correct answer is Rs. 70.

Alternate Method

Given:

Cost of 12 pens and 7 pencils = Rs. 285

Cost of 11 pens (decreased by Rs. 6) and 3 pencils (increased by Rs. 5) = Rs. 118

Calculation:

Let the original cost of 1 pen be x and 1 pencil be y.

=> 12x + 7y = 285 ... (Equation 1)

After price change, the new cost of a pen = (x − 6) and a pencil = (y + 5)

=> 11(x − 6) + 3(y + 5) = 118

=> 11x − 66 + 3y + 15 = 118

=> 11x + 3y − 51 = 118

=> 11x + 3y = 169 ... (Equation 2)

Multiply Equation 1 by 3 and Equation 2 by 7 to eliminate y:

=> 36x + 21y = 855 ... (Equation 3)

=> 77x + 21y = 1183 ... (Equation 4)

Subtracting Equation 3 from Equation 4:

=> 77x − 36x = 1183 − 855

=> 41x = 328

=> x = 328 ÷ 41 = 8

Substitute the value of x in Equation 2:

=> 11(8) + 3y = 169

=> 88 + 3y = 169

=> 3y = 169 − 88 = 81

=> y = 81 ÷ 3 = 27

The original cost of a pen is Rs. 8 and a pencil is Rs. 27.

Now, calculate the required original cost of 2 pens and 2 pencils:

=> Cost = 2x + 2y = 2(8) + 2(27)

=> Cost = 16 + 54 = 70

Therefore The correct answer is Rs. 70.

Additional Information

Linear Equations in Two Variables

The standard form is a1x + b1y + c1 = 0 and a2x + b2y + c2 = 0. The exact solution represents the point of intersection of two straight lines on a graph.

Cross-Multiplication Trick

For basic equations of form a1x + b1y = c1 and a2x + b2y = c2, the direct value of x is solved as (c1b2 − c2b1) ÷ (a1b2 − a2b1).

Consistency of Equations

If a1/a2 ≠ b1/b2, the system has a unique solution. If a1/a2 = b1/b2 ≠ c1/c2, the lines are parallel and have no solution.

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Q64. Answer: (b) Rs. 432

Shortcut Trick

Since the rate is given per month and time is in months, Total Effective Rate = 4% × 9 = 36%.

Simple Interest = 36% of Rs. 1200

=> SI = (36 ÷ 100) × 1200

=> SI = 432

Therefore The correct answer is Rs. 432.

Alternate Method

Given:

Principal (P) = Rs. 1200

Rate of Interest (R) = 4% per month

Time (T) = 9 months

Principal

Rs. 1200

Total Rate

4% × 9 = 36%

Simple Interest

Rs. 432

Formula Used:

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

Calculation:

=> SI = (1200 × 4 × 9) ÷ 100

=> SI = (1200 × 36) ÷ 100

=> SI = 12 × 36

=> SI = 432

Therefore The correct answer is Rs. 432.

Additional Information

Total Amount Formula

Total Amount = Principal + Simple Interest, which can be written as A = P[1 + (RT ÷ 100)].

Unit Consistency Rule

Always ensure that the unit of Time (T) matches the unit of the Rate of Interest (R). If the rate is given per month, the time must strictly be evaluated in months.

Compound Interest

Unlike Simple Interest, Compound Interest is calculated on the principal plus previously accumulated interest. Formula: CI = P(1 + R ÷ 100)^T − P.

Q65. Answer: (d) 13.33

Shortcut Trick

Cost price of 1 pencil = Rs. 180 ÷ 12 = Rs. 15

Selling price of 1 pencil = Rs. 17

Profit on 1 pencil = Rs. 17 − Rs. 15 = Rs. 2

Profit % = (Profit ÷ CP) × 100 = (2 ÷ 15) × 100 = 13.33%

Therefore The correct answer is 13.33%.

Alternate Method

Given:

Cost price of a dozen (12 pencils) = Rs. 180

Selling price of 1 pencil = Rs. 17

Formula Used:

Cost Price (CP) of 1 unit = Total CP ÷ Quantity

Profit = Selling Price (SP) − Cost Price (CP)

Profit Percentage = (Profit ÷ CP) × 100

CP = Rs. 15

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SP = Rs. 17

• Rs. 2 (Profit)

Profit % = (2 ÷ 15) × 100 = 13.33%

Calculations:

=> CP of 1 pencil = 180 ÷ 12 = Rs. 15

=> Profit earned on 1 pencil = 17 − 15 = Rs. 2

=> Profit % = (2 ÷ 15) × 100

=> Profit % = 200 ÷ 15 = 40 ÷ 3 = 13.333... %

=> Rounding off to two decimal places, Profit % ≈ 13.33%

Therefore The correct answer is 13.33%.

Additional Information

Loss Percentage

When the cost price (CP) is greater than the selling price (SP), a loss is incurred. Loss = CP − SP. Loss % = (Loss ÷ CP) × 100.

Marked Price & Discount

Discount is an allowance given by the seller to the buyer on the marked price of the goods. SP = MP − Discount. Discount % = (Discount ÷ MP) × 100.

Dishonest Dealer

When a dealer claims to sell goods at cost price but uses false weights, he makes a profit. Profit % = (Error ÷ True Weight − Error) × 100.

Q66. Answer: (c) 193

Shortcut Trick

Sum of remaining 2 numbers = Total sum − (Sum of first 2 numbers + Third number)

Sum = 655 − (80 × 2 + 109) = 655 − 269 = 386

Average of remaining 2 numbers = 386 ÷ 2 = 193

Therefore The correct answer is 193.

Alternate Method

Given:

Total sum of 5 numbers = 655

Average of the first 2 numbers = 80

The third number = 109

Formula Used:

Sum of numbers = Average × Number of items

Average = Sum of observations ÷ Number of observations

Total Sum of 5 numbers = 655

Sum = 160

Avg = 80 (2 nos)

109

(3rd no)

Sum = 655 − 269 = 386

Avg = 386 ÷ 2 = 193

Calculations:

=> Sum of the first 2 numbers = 80 × 2 = 160

=> Sum of the first 3 numbers = 160 + 109 = 269

=> Sum of the remaining 2 numbers = Total sum − Sum of the first 3 numbers

=> Sum of the remaining 2 numbers = 655 − 269 = 386

=> Average of the remaining 2 numbers = 386 ÷ 2 = 193

Therefore The correct answer is 193.

Additional Information

Weighted Average

When different groups have different averages, their combined average is calculated as (N1A1 + N2A2 + ...) ÷ (N1 + N2 + ...).

Change in Average

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If a specific total is deducted from a group, the remaining sum distributed among the remaining items gives the new group average.

Q67. Answer: (a) 329

Shortcut Trick

Total parts in the ratio = 18 + 12 + 2 = 32

Difference between largest and smallest parts = 18 − 2 = 16

The difference is exactly half of the total parts (16 / 32 = 1/2).

Therefore, the difference in amount = 1/2 × Total Amount

Required difference = 658 ÷ 2 = 329

Therefore The correct answer is Rs. 329.

Alternate Method

Given:

Total amount = Rs. 658

Ratio of shares = 18 : 12 : 2

Formula Used:

Share Difference = (Difference in ratio parts / Total ratio parts) × Total Amount

Total Amount = Rs. 658 (32 Parts)

18 Parts

Largest Share

12 Parts

2

Min

Largest - Smallest = 18 - 2 = 16 Parts

Difference = 16 / 32 × Rs. 658 = Rs. 329

Calculation:

=> Sum of all ratio parts = 18 + 12 + 2 = 32

=> Largest share part = 18

=> Smallest share part = 2

=> Difference in parts = 18 − 2 = 16

=> Required difference = (16 / 32) × 658

=> Required difference = (1 / 2) × 658

=> Required difference = 329

Therefore The correct answer is Rs. 329.

Additional Information

Ratio Distribution

When a quantity N is divided in the ratio a : b : c, the share of the first part is calculated as (a / (a + b + c)) × N.

Difference in Shares

Instead of calculating individual shares and subtracting, directly calculate the difference in ratio parts and divide by the total ratio parts.

Proportion

An equality of two ratios is called a proportion. If a : b = c : d, then a × d = b × c (Product of extremes = Product of means).

Compound Ratio

For two ratios a : b and c : d, their compound ratio is obtained by multiplying the corresponding parts: (a × c) : (b × d).

Q68. Answer: (b) 19

Shortcut Trick

We can solve this quickly using the option elimination method based on basic divisibility rules.

→ Divisibility by 10: Last digit is 9, not 0, so it is not divisible by 10.

→ Divisibility by 12: The number is odd, so it is not divisible by 4 or 12.

→ Divisibility by 9: Sum of digits = 44, which is not a multiple of 9.

→ Since three options are completely eliminated, the number must be divisible by 19.

Therefore The correct answer is 19.

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Alternate Method

Given:

The given number is 444348269.

Method Used:

Direct long division method to check complete divisibility by 19.

Calculations:

=> 44 ÷ 19 = 2, Remainder = 6

=> Bring down 4: 64 ÷ 19 = 3, Remainder = 7

=> Bring down 3: 73 ÷ 19 = 3, Remainder = 16

=> Bring down 4: 164 ÷ 19 = 8, Remainder = 12

=> Bring down 8: 128 ÷ 19 = 6, Remainder = 14

=> Bring down 2: 142 ÷ 19 = 7, Remainder = 9

=> Bring down 6: 96 ÷ 19 = 5, Remainder = 1

=> Bring down 9: 19 ÷ 19 = 1, Remainder = 0

=> The quotient is 23386751 and the final remainder is 0.

=> Hence, the original number is completely divisible by 19.

Therefore The correct answer is 19.

Additional Information

Divisibility by 19 (Osculator Method)

Add 2 × (last digit) to the remaining truncated number. Repeat the process until a 2-digit number is reached. If it is divisible by 19, the entire number is too.

Divisibility by 9

A number is divisible by 9 if the sum of all its digits is completely divisible by 9.

Divisibility by 12

A number is divisible by 12 if it is completely divisible by both its co-prime factors, i.e., 3 and 4.

Q69. Answer: (a) 24,956

Shortcut Trick

Convert the percentage changes into multiplying fractions: +25% = 5/4, +70% = 17/10, and −20% = 4/5.

Final Population = Initial Population × (5/4) × (17/10) × (4/5)

Notice that the fraction (5/4) and (4/5) perfectly cancel each other out.

Final Population = 14680 × (17/10) = 1468 × 17 = 24956.

Therefore The correct answer is 24,956.

Alternate Method

Given:

Initial Population = 14,680

Population change in 1^(st) year = +25%

Population change in 2^(nd) year = +70%

Population change in 3^(rd) year = −20%

14,680

Initial

+25%

18,350

+70%

31,195

−20%

24,956

Final

Net Multiplier = 1.7

Formula Used:

Final Value = Initial Value × (1 ± R1/100) × (1 ± R2/100) × (1 ± R3/100)

Calculations:

=> Final Population = 14680 × (1 + 25/100) × (1 + 70/100) × (1 − 20/100)

=> Final Population = 14680 × (125/100) × (170/100) × (80/100)

=> Final Population = 14680 × (5/4) × (17/10) × (4/5)

=> Final Population = 14680 × (17/10)

=> Final Population = 1468 × 17

=> Final Population = 24,956

Therefore The correct answer is 24,956.

Additional Information

Successive Percentage Change

When a value is subjected to continuous percentage changes year on year, the final value is found directly by multiplying the initial value by all the respective consecutive multiplying factors. The order in which they are multiplied does not affect the final answer.

Effective Percentage Change

For two successive percentage changes of a% and b%, the net percentage change can also be determined using the specific formula: Net % = (a + b + ab/100)%.

Fractional Equivalents

Converting standard percentages to fractions significantly simplifies and accelerates calculation. For example, an increase of 25% corresponds to a multiplier of 5/4, and a decrease of 20% corresponds directly to 4/5.

Q70. Answer: (c) 33.82

Shortcut Trick

Assumed overall average = 42 (from the first 23 matches)

Deviation of the next 10 matches = 15 − 42 = −27

Total deviation = 10 × (−27) = −270

Net change in average = −270 ÷ 33 ≈ −8.18

Overall Average = 42 − 8.18 = 33.82

Therefore The correct answer is 33.82 runs.

Alternate Method

Given:

Average runs of 23 matches = 42

Average runs of next 10 matches = 15

Formula Used:

Combined Average = (n1x1 + n2x2) ÷ (n1 + n2)

23 Matches

Avg: 42

10 Matches

Avg: 15

Total 33 Matches

Overall Avg = ?

Calculations:

=> Total runs in first 23 matches = 23 × 42 = 966

=> Total runs in next 10 matches = 10 × 15 = 150

=> Total runs in all 33 matches = 966 + 150 = 1116

=> Combined Average = 1116 ÷ 33

=> Combined Average = 372 ÷ 11 = 33.8181...

=> Rounding off to two decimal places, the average is 33.82.

Therefore The correct answer is 33.82 runs.

Additional Information

Weighted Average

Used when different groups have different sizes. The formula is A_w = (n1A1 + n2A2) ÷ (n1 + n2).

Deviation Method for Averages

An assumed average is taken and the net deviation of all values from this assumed average is calculated. The true average is Assumed Average + (Net Deviation ÷ Total Count).

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Combined Average

It represents the single average value of two or more independent groups combined together, perfectly preserving the total sum of all values across the groups.

Q71. Answer: (c) One

Given numbers: 71642938

The digits in the number are 7, 1, 6, 4, 2, 9, 3, 8.

Arranging in Ascending Order:

1, 2, 3, 4, 6, 7, 8, 9.

The position of only one digit (4) remains the same.

Hence, the correct answer is 'Option 3'

Q72. Answer: (a) Four

Given: A, B, C, D, E, F and G are sitting around a circular table facing the centre.

1) B sits third to the right of E.

2) F sits to the immediate left of B.

3) C is the immediate neighbour of A and B.

4) G is not the immediate neighbour of F.

Here, There are Four people sit between D and G when counted from the left of G

Hence, the correct answer is "Option 1".

Q73. Answer: (c) 8

BODMAS Table:

Given equation: 38 ÷ 7 + 5 × 20 − 4 = ?

Now, if '+' and '×' and '-' and '÷' are interchanged, then:

=> 38 - 7 × 5 + 20 ÷ 4 = ?

=> 38 - 35 + 5

=> 43 -35

= 8

Hence, the correct answer is "Option 3".

Q74. Answer: (d) Sister

Family Chart:

Decoding the Symbols:

Symbol	•	•	×	÷
Meaning	Daughter	Wife	Father	Brother

Given: 'A + E – F x N ÷ S'

It means: A is the daughter of E, E is the wife of F, F is the Father of N, N is the brother of S.

So, A is the 'Sister' of S.

Hence, the correct answer is "Option 4".

Q75. Answer: (b) 24

Given numbers: 7145362

The digits in the number are 7, 1, 6, 4, 2, 9, 3, 8.

Logic: add 2 to every digit (both even and odd).

New number formed: 9367584

The sum of the last two and first two digits in the new number thus formed:

Sum = (First two digits) + (Last two digits)

Sum = (9 + 3) + (8 + 4)

Sum = 12 + 12

Sum = 24

Hence, the correct answer is 'Option 2'

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Q76. Answer: (c) Only conclusion (I) follows.

Given Statements:

All physicists are chemists.

No chemists are biologists.

The least possible Venn diagram for the given statement is:

Conclusions:

I. No biologists are physicists.

Since No Chemist is a Biologist, and all Physicists are inside the set of Chemists, it logically follows that No Biologist can be a Physicist.

This is a direct conclusion from the two statements.

II. Some biologists are physicists.

This is the contradictory statement to Conclusion I.

Since we established that No Biologist is a Physicist, the statement "Some biologists are physicists" is false.

So, Only conclusion (I) follows.

Hence, the correct answer is "Option 3".

Q77. Answer: (d) 34

The given interchange rules are: '+' ↔ '×' and '−' ↔ '÷'.

The original equation: 21 ÷ 57 − 3 × 8 + 4 = ?

After applying the interchange rules, the new equation is:

21 − 57 ÷ 3 + 8 × 4 = ?

Now, we solve the equation following the BODMAS rule:

= 21 − 57 ÷ 3 + 8 × 4

= 21 − 19 + 32

= 2 + 32

= 34

Hence, the correct answer is "Option 4".

Q78. Answer: (c) 5

The logic followed here is:

For, 'MADE' is coded as '4172'

For, 'HAME' is coded as '2475'

So, 5 is the code for 'H' in the given code language

Hence, the correct answer is "Option 3".

Q79. Answer: (b) 147

The logic followed here is:

thus, "147" will replace the question mark in the given series.

Hence, the correct option is "Option 2".

Q80. Answer: (d) 3

The logic followed here is:

For, 'ALPS' is coded as '3257'

For, 'PUNE' is coded as '1346'.

As P is common in both the words, 3 is also common.

So, the code of P can be 3.

Hence, the correct answer is "Option 2".

Q81. Answer: (b) Six

Given: (Left) 1 & 9 6 > 7 5 * 7 + 5 ^ 7 0 * 4 % $ (Right)

Now,

Symbols which is immediately preceded by a number and also immediately followed by another symbol

So, Needed pattern is: Number - Symbol - Number.

There are 6 Symbols which are preceded by a number and also immediately followed by a number.

Hence, the correct answer is 'Option 2'.

Q82. Answer: (d) 2

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order.

1) Only three boxes are kept above A.

2) Only one box is kept between F and A.

3) Only three boxes are kept between F and E.

4) E is kept at some place above A.

5) B is kept immediately below E.

6) G is kept at one of the places above D.

7) C is not kept immediately above or below F.

C
E
B
A
G
F
D

So, there are 'Two' boxes are kept above B.

Hence, the correct answer is "Option 4".

Q83. Answer: (a) TLP 26

The logic followed here is:

So, 'TLP 26' will replace the question mark in the given series.

Hence, the correct answer is "Option 1".

Q84. Answer: (b) PS-JM

The logic followed here is:

Logic:

Three pairs (MP-GK, JM-DH, and TW-NR) follow the shift pattern of -6, - 5.

The pair PS-JM follows the shift pattern of -6, -6.

Here, 'PS-JM' is odd among the given options.

Hence, the correct answer is "Option 2".

Q85. Answer: (b) XUR 354

The logic followed here is:

So, 'XUR 354' will replace the question mark in the given series.

Hence, the correct answer is "Option 2".

Q86. Answer: (c) 14

Given: (Left) 267 513 671 895 729 (Right)

Now,

The digits of each number are added and their respective resultants are arranged in the ascending order, what is the number placed 4th from the right end:

So, (Left) 9, 14, 15, 18, 22 (Right)

Number	Sum of Digits	Resultant Sum
267	2 + 6 + 7	15
513	5 + 1 + 3	9
671	6 + 7 + 1	14

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895	8 + 9 + 5	22
729	7 + 2 + 9	18

The number placed 4th from the right end is 14.

Hence, the correct answer is 'Option 3'.

Q87. Answer: (a) XAZC

The logic followed here is:

For, 'RUTW is related to TWVY'

For, 'MPOR is related to ORQT'

Similarly, for 'VYXA'

So, 'VYXA' will be related to 'XAZC'

Hence, the correct answer is "Option 1".

Q88. Answer: (b) 16 km towards north

Given:

Shyam starts from Point A and drives 12 km towards east.

He then takes a right turn, drives 7 km, turns right and drives 5 km.

He then takes a left turn and drives 9 km.

He takes a final right turn, drives 7 km and stops at Point P.

So, He should drive 16 km towards north in order to reach Point A again

Hence, the correct answer is "Option 2".

Q89. Answer: (d) Four

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order.

1) Only two boxes are kept between G and A.

2) Only F is kept above B.

3) No box is kept below A.

4) E is kept at some place below C but at some place above D.

F
B
C
G
D
A

E is kept in the remaining place.

F
B
C
G
E
D
A

So, there are 'Four' boxes are kept between D and F

Hence, the correct answer is "Option 4".

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Q90. Answer: (a) XVN : ZXP

The position and positional values or English Alphabets are:

Now,

ACF : CEH

PET : RGV

Let's check each Option One by One.

Option 1) XVN : ZXP

Option 2) WDX : ZFY

Option 3) QTP : SUW

Option 4) SAD : TBO

So, Only XVN : ZXP follows the pattern of given letter cluster.

Hence, the correct answer is 'Option 1'.

Q91. Answer: (b) MUSK - KMSU - MKUS

Now,

HIVE - EHVI - HEIV

FANG - GFNA - FGAN

Let's check each Option One by One.

Option 1) SORT - TSOR - ORTS

S	O	R	T
1	2	3	4
T	S	O	R
4	1	2	3
O	R	T	S
2	3	4	1

Option 2) MUSK - KMSU - MKUS

M	U	S	K
1	2	3	4
K	M	S	U
4	1	3	2
M	K	U	S
1	4	2	3

Option 3) TENS - ETNS - SENT

T	E	N	S
1	2	3	4
E	T	N	S
2	1	3	4
S	E	N	T
4	2	3	1

Option 4) RAIN - NRIA - RANI

R	A	I	N
1	2	3	4
N	R	I	A

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4	1	3	2
R	A	N	I
1	2	4	3

So, Only MUSK - KMSU - MKUS follows the pattern of given letter cluster.
Hence, the correct answer is 'Option 2'.

Q92. Answer: (b) Only conclusion (I) follows.

Given Statements:
Some birds are animals.
All animals are tables.
The least possible Venn diagram for the given statement is:
Conclusions:
(I): Some birds are tables.
This follows directly from the combination of the two statements.
The portion of Birds that are Animals must also be Tables.
Therefore, Conclusion (I) logically follows.
(II): All tables are animals.
Statement 2 ("All animals are tables") is an 'All A are B' statement.
This does not allow us to reverse the relationship to 'All B are A' (i.e., all tables are animals).
There could be tables that are not animals.
Therefore, Conclusion (II) does not follow.
So, Only conclusion (I) follows.
Hence, the correct answer is "Option 2".

Q93. Answer: (b) OKM

Cluster	Positions	1st to 2nd Shift	2nd to 3rd Shift	Pattern
1) L H K	L(12), H(8), K(11)	8 - 12 = -4	11 - 8 = +3	-4, +3
2) O K M	O(15), K(11), M(13)	11 - 15 = -4	13 - 11 = +2	-4, +2
3) U Q T	U(21), Q(17), T(20)	17 - 21 = -4	20 - 17 = +3	-4, +3
4) R N Q	R(18), N(14), Q(17)	14 - 18 = -4	17 - 14 = +3	-4, +3

The common pattern followed by LHK, UQT, and RNQ is a shift of -4, +3.
The cluster OKM follows a different pattern of -4, +2.
Therefore, the letter-cluster that does not belong to the group is OKM.

Q94. Answer: (c) 103

The logic followed here is:
Logic:
The question mark is the 10th term, which belongs to Series 2.
Next term = Last term of Series 2 + 13
Next term = 90 + 13 = 103
thus, "103" will replace the question mark in the given series.
Hence, the correct option is "Option 3".

Q95. Answer: (b) 18 km towards East

Given:
Babar starts from Point A and drives 14 km towards West.
He then takes a left turn, drives 7 km, turns right and drives 9 km.
He then takes a right turn and drives 7 km.
He takes a final right turn, drives 5 km and stops at Point P.
So, he should drive 18 km towards East in order to reach Point A again.

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Hence, the correct answer is "Option 2".

Q96. Answer: (a) SO−ON

The logic followed here is:

Option 1) SO−ON

Option 2) AW−XT

Option 3) PL−MI

Option 4) TP−QM

Here, 'SO−ON' is odd among the given options.

Hence, the correct answer is "Option 1".

Q97. Answer: (d) 192

The logic followed here is:

thus, "192" will replace the question mark in the given series.

Hence, the correct option is "Option 4".

Q98. Answer: (d) Five

Given: Seven boxes F, G, H, I, K, L and O are kept one over the other but not necessarily in the same order.

1) O is kept second from the bottom.

2) Only three boxes are kept between O and G.

3) L is kept at one of the positions below O.

4) Only I is kept between G and H.

5) F is kept at one of the positions above G.

F
G
I
H
O
L

K will sit in the remaining position.

F
G
I
H
K
O
L

So, there are 'Five' boxes are kept between L and F.

Hence, the correct answer is "Option 4".

Q99. Answer: (a) N

Given: J, K, L, M, N, O and S are sitting around a circular table, facing the centre of the table.

1) Only three people sit between O and J when counted from the left of O.

2) Only three people sit between K and M when counted from the right of M.

3) S sits to the immediate right of K.

4) N is an immediate neighbour of M as well as J.

Here, N sits second to the left of L

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Hence, the correct answer is "Option 1".

Q100. Answer: (c) 262, 147

The logic followed here is:

Logic: Second Number = First Number - 115.

227, 112

=> 227 - 115 = 112

240, 125

=> 240 - 115 = 125

Now, checking the options:

Option 1) 210, 85

=> 210 - 115 ≠ 85

Option 2) 254, 129

=> 254 - 115 ≠ 129

Option 3) 262, 147

=> 262 - 115 = 147

Option 4) 215, 110

=> 215 - 115 ≠ 110

Hence, the correct option is "Option 3"

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