RRB NTPC (UG) CBT-I Official Paper (Held On: 12 Aug, 2025 Shift 1) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. Which of the following Articles deals with the citizenship of people of Indian origin residing outside India?

(a) Article 8
(b) Article 11
(c) Article 7
(d) Article 9

Q2. The Indian handicraft industry suffered significant decline under colonial economic policies. What was a major reason for the decline of Indian handicrafts during British rule?

(a) Environmental degradation
(b) Rise of Indian industry
(c) Influx of machine-made British goods
(d) Lack of domestic demand

Q3. Which of the following countries does NOT share a land border with India?

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

Q4. What is the primary goal of the Indian government's Bhashini project?

(a) To create a multilingual AI platform for real-time translation among Indian languages
(b) To establish a national database of dialects
(c) To develop a new programming language for Indian developers
(d) To digitise ancient Indian manuscripts

Q5. What was India's Human Development Index (HDI) value in the 2025 UNDP report?

(a) 0.690
(b) 0.676
(c) 0.685
(d) 0.700

Q6. Which desktop element in Windows displays system notifications, date and time, and background apps status?

(a) File Explorer
(b) Notification Area
(c) Start Menu
(d) Control Panel

Q7. Article 323B of the Constitution of India (added by the 42nd Amendment) empowers the Parliament to establish tribunals for adjudication of matters related to certain subjects. Which of the following matters is specifically covered under Article 323B?

(a) Matters such as taxation, foreign exchange, land reforms, etc., which can be assigned to tribunals by legislation
(b) Appointment of Supreme Court judges
(c) Recruitment and service conditions of public servants (civil services)
(d) Only industrial disputes between employers and workers

Q8. Which sector(s) employed the largest share of the working population in India on the eve of independence?

(a) Secondary sector
(b) Primary sector
(c) Both tertiary and secondary sectors
(d) Tertiary sector

Q9. Impulse is defined as _____.

(a) rate of change of force
(b) change in displacement
(c) product of mass and velocity
(d) product of force and time

Q10. The First Battle of Panipat was fought in 1526, replacing the Lodi Dynasty with Mughal rule in India. It was fought between Ibrahim Lodi and _____.

(a) Shah Jahan
(b) Akbar
(c) Aurangzeb
(d) Babar

Q11. Which state government introduced the Drone Promotion and Utilisation Policy, 2025?

(a) Madhya Pradesh
(b) Jharkhand
(c) Punjab
(d) Odisha

Q12. Which leader played the most crucial role in integrating princely states into India postindependence?

(a) BR Ambedkar
(b) Sardar Vallabhbhai Patel
(c) Jawaharlal Nehru
(d) Subhas Chandra Bose

Q13. Which of the following was the objective of the law enacted in 1856 in India?

(a) Banning of child labour
(b) Abolition of caste system
(c) Temple entry for Shudras
(d) Legalising widow remarriage

Q14. What was the theme of the IIAS-DARPG India Conference held in New Delhi in February 2025?

(a) Digital Transformation in Governance – Empowering Citizens and Reaching the Last Mile
(b) Next Generation Administrative Reforms – Empowering Citizens and Reaching the Last Mile
(c) Innovations in Public Policy
(d) Strengthening Federal Structures

Q15. Which Act first created the position of a Governor-General of India with civil and military authority?

(a) Charter Act 1833
(b) Regulating Act
(c) Government of India Act 1858

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(d) Pitt's India Act

Q16. Which level of government generally legislates on matters such as police, public health and agriculture in India?

(a) Union Government
(b) State Legislatures
(c) Inter-State Council
(d) Local Bodies

Q17. In which northeastern state was the Hornbill Festival held with record participation in December 2024?

(a) Nagaland
(b) Meghalaya
(c) Manipur
(d) Assam

Q18. By what year is the India-UK FTA expected to be fully implemented?

(a) 2027
(b) 2025
(c) 2030
(d) 2026

Q19. Which version of the skill development scheme, launched by the government and implemented from FY 2022 to 2026, aims to provide free training to rural youth in India?

(a) Skill India 3.0
(b) Pradhan Mantri Kaushal Vikas Yojana 2.0
(c) Pradhan Mantri Kaushal Vikas Yojana 4.0
(d) Deen Dayal Upadhyaya Grameen Kaushalya Yojana 2.0

Q20. Which Indian relay team set a national record in the 4x100m event at the National Relay Carnival 2025?

(a) Gurindervir Singh, Animesh Kujur, Manikanta H, Amiya Mallick
(b) Gurindervir Singh, Animesh Kujur, Manikanta H, Amlan Borgohain
(c) Srabani Nanda, Dutee Chand, Hima Das, Archana Suseendran
(d) Amiya Mallick, Mohammed Anas, Noah Nirmal Tom, Rajesh Ramesh

Q21. Which of the following is a small hand-held pointing device that controls the twodimensional movement of the cursor on a screen?

(a) Mouse
(b) Scanner
(c) Touchscreen
(d) Keyboard

Q22. Article 6 of the Constitution pertains to the citizenship of persons who migrated to India from which of the following territories?

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

Q23. Which of the following administrative features was common to both Pallava and Pandya kingdoms?

(a) Rule by elected monarchs
(b) Division of the kingdom into Mandalams and Nadus
(c) Abolition of land revenue taxes
(d) Village assemblies were called Sabha and Ur

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Q24. How many total Sustainable Development Goals (SDGs) were adopted at the United Nations Sustainable Development Summit in New York in September 2015?

(a) 15
(b) 16
(c) 17
(d) 18

Q25. Which of the following is a feature of the Eastern Coastal Plain of India?

(a) Wider and formed by alluvial deposits
(b) Presence of numerous estuaries
(c) Located between the Western Ghats and the Arabian Sea
(d) Narrow and rocky

Q26. Which of the following Indian organisations successfully conducted the combat firing of the Multi-Influence Ground Mine (MIGM) in May 2025?

(a) Hindustan Aeronautics Limited and Indian Air Force
(b) Defence Research and Development Organisation and Indian Navy
(c) Indian Space Research Organisation and Indian Army
(d) Bharat Dynamics Limited and Indian Coast Guard

Q27. Kathputli is a traditional puppet show of which of the following Indian states?

(a) Rajasthan
(b) Assam
(c) Odisha
(d) Kerala

Q28. As per the Ministry of Agriculture data from 1950–51 to 2014–15, which land use category in India has shown a declining trend?

(a) Net sown area
(b) Forest area
(c) Barren and wasteland
(d) Area under non-agricultural use

Q29. In which year did Andre-Marie Ampère publish his magnum opus ‘Mathematical Theory of Electrodynamic Phenomena Deduced Solely from Experiments’?

(a) 1833
(b) 1827
(c) 1818
(d) 1811

Q30. Harold C Urey was awarded the Nobel Prize in Chemistry, in 1934:

(a) for discovery in the chemistry of the transuranium elements
(b) for the discovery of heavy hydrogen
(c) for the discovery and development of conductive polymers
(d) for the development of the density-functional theory

Q31. Which of the following instruments is primarily used by the RBI for monetary policy implementation in the post 1991 reform era?

(a) Repo rate
(b) Export incentives
(c) Tariff rates
(d) Direct taxes

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Q32. Which economic system dominated India on the eve of independence (in 1947)?

(a) Import substitution industrialisation
(b) Colonial agrarian economy
(c) Global free market
(d) Socialist planned economy

Q33. Which of the following is a discretionary power of the President of India?

(a) Dissolving the Lok Sabha without advice
(b) Appointing the Chief Justice of India
(c) Appointing a Prime Minister when no party has a clear majority
(d) Giving assent to a Money Bill

Q34. The Gulf of Mannar lies between:

(a) mainland India and Andaman Islands
(b) India and Sri Lanka
(c) Sri Lanka and Maldives
(d) India and Maldives

Q35. What is the purpose of the 'Melt and Pour' rule introduced in the DMI&SP Policy 2025?

(a) Importing partially processed steel and finishing it domestically qualifies as “domestic”
(b) Steel exports must include documentation of Indian melting processes
(c) Steel used in government-funded projects is completely manufactured in India
(d) Biometric authentication is required at smelting plants for traceability

Q36. Which important Sikh festival is on 5 November 2025?

(a) Baisakhi
(b) Lohri
(c) Guru Nanak Jayanti
(d) Holi

Q37. Which film won the Best Picture award at the 25th IIFA Awards in 2025?

(a) Article 370
(b) Laapataa Ladies
(c) Stree 2
(d) Bhool Bhulaiyaa 3

Q38. Which Indian space tech startup along with Google launched India's first private satellite constellation?

(a) Ship Rocket
(b) Udaan
(c) Livspace
(d) Pixxel

Q39. The government initiative known as KIRTI, an acronym for Khelo India Rising Talent Identification, was inaugurated in _____

(a) 2023
(b) 2024
(c) 2025
(d) 2022

Q40. Which Indian city was announced by the global governing body WPA as the host of the 2025 Para Athletics World Championships?

(a) New Delhi
(b) Chennai
(c) Bengaluru
(d) Mumbai

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MATHEMATICS

Q41. A man driving a car at a speed of 99 km/hr crosses a bridge in 1.2 minutes. Find the length (in metres) of the bridge.

(a) 1970
(b) 1980
(c) 1960
(d) 1950

Q42. Sapna invested Rs. 20,900 on simple interest, partly at 9% per annum and partly at 13% per annum. If she earns equal interests from the two investments after 3 years, then find the sum invested at 9% per annum (in Rs.).

(a) 12,349
(b) 12,350
(c) 12,352
(d) 12,348

Q43. Rahul, Monika, and Yuvraj invest Rs. 1,310, Rs. 1,430, and Rs. 1,040, respectively, to start a business. If the profit at the end of the year is Rs. 1,890, then what is the share of Yuvraj in the profit?

(a) Rs. 519
(b) Rs. 523
(c) Rs. 520
(d) Rs. 522

Q44. The perimeter of a square is 336 m. Its area (in m^2) is:

(a) 7052
(b) 7036
(c) 7057
(d) 7056

Q45. 3 years ago, the age of a father was 21 years more than twice his son's age. After how many years, from now, will he be twice his son's age?

(a) 18
(b) 23
(c) 15
(d) 21

Q46. A trader claims to sell vegetables at a profit of 57%, but also dishonestly uses a weight which is 13% less than what is mentioned on it. Find the total percentage of profit earned by the trader. (Round off the answer to the nearest whole number.)

(a) 80%
(b) 79%
(c) 85%
(d) 75%

Q47. Which of the following numbers divides 861616843?

(a) 43
(b) 47
(c) 50
(d) 36

Q48. If the 6-digit number N18M05 is divisible by 11, then which of the options below can give a possible correct relation between M and N?

(a) M = N
(b) M - N = 2
(c) M - N = 1
(d) M + N = -2

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Q49. Which of the following ratios is the greatest?

(a) 37 : 76
(b) 43 : 65
(c) 35 : 72
(d) 50 : 60

Q50. Which of the following statements is correct?

(a) A square is a special case of neither a rectangle nor a rhombus.
(b) A square is a special case of a rhombus only.
(c) A square is a special case of both a rectangle and a rhombus
(d) A square is a special case of a rectangle only

Q51. I bought two dresses for Rs. 1,200. I sold the first one at a loss of 9% and the second at a gain of 18%. If, on the whole I made neither a loss nor a gain, find the cost price (in Rs.) of the first dress.

(a) 824
(b) 820
(c) 784
(d) 800

Q52. The simple interest on a certain sum for 3 1/3 years at the rate of 4.2% per annum is Rs. 5,845. What will be the amount payable on the same sum at the rate of 6.4% per annum simple interest in 12 1/2 years?

(a) Rs. 75,143
(b) Rs. 75,148
(c) Rs. 75,131
(d) Rs. 75,150

Q53. By how much is 65% of 65 greater than (1)/(5) of 45?

(a) 33.25
(b) 27.25
(c) 30.25
(d) 31.25

Q54. Find the value of: [459 ÷ {11 + 2 × (5 - 9)}].

(a) 153
(b) 155
(c) 152
(d) 154

Q55. If (x)/(y)=cot θ where θ is an acute angle, then cosec θ = _____.

(a) x/y
(b) $(\sqrt{(x^2+y^2)})/(y)$
(c) $(\sqrt{(y^2-x^2)})/(y)$
(d) $(\sqrt{(x^2+y^2)})/(x)$

Q56. Pipe P can fill (3)/(4) part of a tank in 27 hours, and pipe Q can fill (2)/(3) part of the same tank in 12 hours. Both P and Q were kept open for 6 hours, then both were closed. Pipe R alone was then opened and it emptied the water in the tank in 8 hours. Pipes P, Q and R together can fill the empty tank in:

(a) 31 hours
(b) 37 hours
(c) 48 hours
(d) 45 hours

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Q57. What is the area of a triangle with a base of 12 cm and a height of 8 cm?

(a) 16 cm^2
(b) 24 cm2
(c) 48 cm2
(d) 96 cm2

Q58. After giving two successive discounts, each of x% on the marked price of an article, the total discount is Rs. 18,000. If the marked price of the article is Rs. 50,000, find the value of x.

(a) 20
(b) 30
(c) 10
(d) 40

Q59. The average of first 160 even numbers is

(a) 161.5
(b) 162
(c) 161
(d) 160.5

Q60. Pipe A can fill a tank in 18 hours, pipe B can fill the same tank in 21 hours and pipe C can fill the same tank in 16 hours. The time taken by them to fill the same tank if they operate together is::

(a) 6 6/167 hours
(b) 11 6/167 hours
(c) 7 6/167 hours
(d) 13 6/167 hours

Q61. Which of the following numbers divides 814242541?

(a) 7
(b) 12
(c) 8
(d) 15

Q62. In covering a distance of 30 km, Anmol takes 7 hours more than Nikhil. If Anmol doubles his speed, then he would take 8 hours less than Nikhil. Anmol's speed is:

(a) 7 km/hr
(b) 1 km/hr
(c) 6 km/hr
(d) 3 km/hr

Q63. The current population of a town is 12,500. It increases by 52% and 30% in two successive years but decreases by 15% in the third year. What is the population of the town at the end of the third year?

(a) 20,995
(b) 20,991
(c) 20,990
(d) 20,998

Q64. The product of two consecutive natural numbers is 702. The greater of the two numbers is:

(a) 26
(b) 27
(c) 38
(d) 24

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Q65. The LCM of the numbers 12.8 and 0.004 is:

(a) 128
(b) 0.128
(c) 1.28
(d) 12.8

Q66. A retailer offers the following discount scheme to his customers for the purchase of articles. 'Buy 30 and get 10 free' Find the discount percentage offered.

(a) 26%
(b) 25%
(c) 30%
(d) 28%

Q67. Find the value of x satisfying: 5(2x2 - 7) - 2(5x2 + 8x - 2) = 12

(a) -(43)/(16)
(b) -(39)/(16)
(c) -(53)/(16)
(d) -(49)/(16)

Q68. Rs. 12,300 were divided among A, B and C such that 3 times the share of A = 6 times the share of B = 2 times the share of C. Find the share of A.

(a) Rs. 4,100
(b) Rs. 3,915
(c) Rs. 4,063
(d) Rs. 3,924

Q69. Find the value of 50-6 ÷ 5018 × 50-5

(a) 50^(-19)
(b) 50^(-29)
(c) 50^(-36)
(d) 50^(-32)

Q70. Find the median of 26, 13, 14, 15, 8, 36, 23, 35 and 50

(a) 35
(b) 23
(c) 26
(d) 50

GENERAL INTELLIGENCE AND REASONING

Q71. Town H is to the east of town R and to the north of town D. Town E is southeast of town H. In which direction is town D with respect to town R?

(a) Southeast
(b) Southwest
(c) North
(d) West

Q72. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) > 5 * \ + 9 & 6 # 6 4 $ & / @ # $ & 8 3 < (Right)

How many such symbols are there that are immediately preceded by a number and also immediately followed by another symbol?

(a) Four
(b) Two

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(c) One
(d) Three

Q73. A, B, C, D, Q, R and S are sitting around a circular table, facing the centre of the table. Q sits to the immediate right of D. Only three people sit between Q and S, when counted from the left of Q. Only three people sit between D and C. A sits to the immediate right of R. How many people sit between D and R, when counted from the right of R?

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

Q74. 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.

JUNK - UJNK - KUJN

LACK - ALCK - KALC

(a) BUNS - UBNS - SUNB
(b) MOST - OMST - OSTM
(c) FROM - RFOM - MRFO
(d) MOCK - MCOK - KCOM

Q75. If + means −, − means ×, × means ÷ and ÷ means +, then what will come in place of the question mark (?) in the following equation?

51 + 8 − 8 ÷ 80 × 4 = ?

(a) 265
(b) 20
(c) 14
(d) 7

Q76. 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) OJR
(b) JEM
(c) GBI
(d) LGO

Q77. What should come in place of the question mark (?) in the given series?

90 90 91 95 104 ?

(a) 122
(b) 120
(c) 121
(d) 119

Q78. In a certain code language, ‘EARS’ is coded as ‘4259’ and ‘SARI’ is coded as ‘9725’. What is the code for ‘I’ in the given code language?

(a) 5
(b) 9
(c) 2
(d) 7

Q79. 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 below F. Only two boxes are kept between F and A. Only D is kept immediately above B. C is kept at some place below G and at some place above E. How many boxes are kept between B and F?

(a) 4
(b) 1

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(c) 2
(d) 3

Q80. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which 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) LNH
(b) GIC
(c) EGB
(d) IKE

Q81. If + means −, − means ×, × means ÷, ÷ means +, then what will come in place of the question mark (?) in the following equation?

18 − 2 + 48 × 4 ÷ 21 = ?

(a) 35
(b) 45
(c) 30
(d) 40

Q82. 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 cars are buses.

Some cars are trucks.

Conclusions (I): Some trucks are cars.

Conclusions (II): Some buses are cars.

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

Q83. 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.

COME - OCME - EOCM

NEAT - ENAT - TENA

(a) SANK - ASNK - KASN
(b) GONE - OGNE - EONG
(c) DOST - DSOT - TSOD
(d) HEAT - EHAT - EATH

Q84. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

(38, 12, 456)

(44, 11, 484)

(a) (67, 5, 365)
(b) (38, 8, 304)
(c) (61, 4, 254)
(d) (43, 6, 278)

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Q85. Harry starts from Point A and drives 1 km towards the south. He then takes a right turn and drives 7 km, then turns right and drives 8 km. He then takes a right turn and drives 15 km. He takes a final right turn, drives 7 km and stops at Point P. How far (shortest distance) and in which direction should he drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) 8 km to the west
(b) 10 km to the west
(c) 9 km to the west
(d) 5 km to the west

Q86. Seven boxes U, V, W, X, E, F and G are kept one over the other but not necessarily in the same order.

Only two boxes are kept between V and X. Only W is kept above F. No box is kept below X. E is kept at some place below G but at some place above U. Which box is kept third above U?

(a) X
(b) G
(c) E
(d) W

Q87. 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 trams are cows.

No cow is a bun.

Conclusions:

(I): No tram is a bun.

(II): Some buns are cows.

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

Q88. SWER is related to GKSF in a certain way based on the English alphabetical order. In the same way, WAIV is related to KOWJ. To which of the given options is MQYL related, following the same logic?

(a) AEMZ
(b) AEMU
(c) AZEM
(d) AZME

Q89. Each of the digits in the number 19758436 is arranged in descending order from left to right. The position(s) of how many digits will remain unchanged as compared to that in the original number?

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

Q90. Each of the digits in the number 8934612 is arranged in ascending order from left to right. What will be the sum of the digits that are second from the left and second from the right in the new number thus formed?

(a) 6
(b) 10
(c) 7
(d) 8

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Q91. What should come in place of the question mark (?) in the given series?

99, 100, 102, 106, 114, ?

(a) 130
(b) 135
(c) 125
(d) 103

Q92. What should come in place of the question mark (?) in the given series?

3 13 28 48 ? 103

(a) 71
(b) 73
(c) 68
(d) 70

Q93. Seven people, D, E, F, G, H, I and X, are sitting in a row facing North. Only two people sit to the left of G. Only three people sit between G and H. Only one person sits between H and F. E sits to the immediate left of I. D is not an immediate neighbour of H. How many people sit to the right of X?

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

Q94. Which of the following letter-clusters will replace the question mark (?) in the given series to make it logically complete?

VRM 9 WTJ 6 XVG 3 YXD 0 ?

(a) ZZA -3
(b) ZYZ -3
(c) ZZA -6
(d) ZZZ -6

Q95. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

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

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

(a) 1
(b) 5
(c) 9
(d) 4

Q96. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

VEC WFD XGE YHF ?

(a) ZVG
(b) ZWR
(c) ZIG
(d) ZML

Q97. Seven boxes V, W, X, Y, Z, Q and R are kept one over the other but not necessarily in the same order. Only two boxes are kept between Q and V. Only Y is kept above W. No box is kept below V. X is kept at some place below Z but at some place above R. Which box is kept third above R?

(a) Z
(b) Q
(c) X
(d) W

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Q98. 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) EAW
(b) OKG
(c) DZB
(d) MIE

Q99. A is the son of S. D is the daughter of F. F is the father of G. G is the sister of A. A is married to Q. W is the son of A. How is S related to D?

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

Q100. In a certain code language, 'FOUR' is coded as '5427' and 'RISE' is coded as '6143'. What is the code for 'R' in the given code language?

(a) 7
(b) 3
(c) 4
(d) 6

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) Article 8

The correct answer is Article 8.

Key Points

• Article 8 of the Indian Constitution deals specifically with the citizenship of people of Indian origin residing outside India.

• It provides that a person who is of Indian origin and residing outside India, but born outside India, can register themselves as an Indian citizen with the diplomatic or consular representatives of India in the country where they currently reside.

• This article ensures that individuals of Indian descent, who have migrated to other countries but wish to retain their ties with India, can acquire Indian citizenship under certain conditions.

• This provision aims to maintain a connection with the Indian diaspora and give them the opportunity to participate in India's socio-political framework. Hence, this statement is correct.

• Article 8 complements other articles in Part II of the Constitution that deal with citizenship by addressing unique cases of individuals born outside India but having Indian origin. Hence, the correct answer is Article 8.

Additional Information

• Citizenship under Part II of the Indian Constitution:

• Articles 5 to 11 of the Constitution of India govern the provisions related to citizenship.
• Article 5: Deals with citizenship at the commencement of the Constitution for people domiciled in India.
• Article 6: Provides citizenship rights for migrants from Pakistan to India.
• Article 7: Covers the citizenship of persons who migrated to Pakistan but later returned to India.
• Article 9: States that any person who voluntarily acquires citizenship of another country will lose Indian citizenship.
• Article 10: Protects the rights of citizenship once acquired and provides for its continuance.
• Article 11: Grants Parliament the power to regulate citizenship by law, enabling future legislation like the Citizenship Act, 1955.
• Citizenship Act, 1955:
• This Act was enacted by Parliament under Article 11 to provide detailed provisions for acquiring and terminating citizenship.
• It outlines the conditions for citizenship by birth, descent, registration, naturalization, and incorporation of territory.
• Section 7: Provides Overseas Citizenship of India (OCI) to Indian-origin individuals who were not eligible for full citizenship but wanted a connection with India.
• Indian Diaspora:
• India has one of the largest diasporas in the world, with over 32 million people of Indian origin residing outside India.
• Diaspora contributes significantly to India's economy through remittances, which accounted for $87 billion in 2021.
• The government has launched initiatives like the Pravasi Bharatiya Divas to engage with the Indian diaspora.

Important Points

• Key Considerations:
• Citizenship provisions are crucial for maintaining India's connection with its diaspora, ensuring their involvement in India's socio-economic growth.
• The government frequently updates policies to strengthen ties with overseas Indians, including issuing OCI cards and organizing cultural events.
• The Constitution provides a robust framework, and the Citizenship Act complements it with necessary legal provisions.

Q2. Answer: (c) Influx of machine-made British goods

The correct answer is Influx of machine-made British goods.

Key Points

• Influx of machine-made British goods: During British rule, India faced a massive influx of machine-made goods from Britain. These goods were produced in factories using advanced technology, making them cheaper and more abundant than handcrafted Indian products. This led to the erosion of demand for Indian handicrafts in both domestic and international markets.
• The British imposed high taxes and tariffs on Indian handmade goods while promoting the sale of British manufactured products. This created an unfair trade environment, further deepening the decline of Indian handicrafts.
• Indian artisans, who relied on traditional methods and manual labor, could not compete with the efficiency and lower costs of British machine-made goods. As a result, many artisans lost their livelihoods. Hence, this was a major reason for the decline of Indian handicrafts.
• Economic exploitation: The colonial rulers prioritized the economic interests of Britain over the welfare of Indian industries. They systematically destroyed the thriving handicraft industry by promoting British goods and discouraging Indian production. This caused a significant loss of traditional knowledge and craftsmanship over time.

Additional Information

• Impact of British rule on Indian handicrafts:
• Indian handicrafts were widely known for their intricate designs, quality, and craftsmanship. Products such as textiles, pottery, and jewelry were exported globally before colonial rule.
• The British introduced policies that favored the import of British goods and discouraged Indian exports. This led to a decline in the international reputation of Indian handicrafts.
• Environmental degradation:
• While environmental degradation may have had some indirect impact, it was not the primary cause of the decline of Indian handicrafts during British rule. The main reason was the economic exploitation and policy-driven influx of British goods. Hence, option 1 is not correct.
• Rise of Indian industry:
• The rise of Indian industry was a later phenomenon, primarily after independence. During British rule, Indian industries were suppressed to promote British goods. Thus, option 2 is not correct.
• Lack of domestic demand:
• Indian handicrafts faced reduced domestic demand due to the availability of cheaper British machine-made goods. However, this was a consequence of colonial policies rather than a lack of interest in Indian products. Hence, option 4 is not fully correct.

Important Points

• British Policies:

• Free trade policies: The British adopted free trade policies that allowed their goods to enter Indian markets without restrictions, while heavily taxing Indian products.

• The introduction of railways and improved transportation further facilitated the influx of British goods into remote parts of India, saturating the market with cheaper alternatives.

• Decline of craftsmanship:

• The decline of Indian handicrafts led to the loss of traditional skills passed down through generations. Many artisans were forced to take up menial jobs or migrate to urban areas in search of alternative employment.

• The decline also resulted in regional economic disparity, as areas dependent on handicrafts suffered economic stagnation.

Q3. Answer: (a) Sri Lanka

The correct answer is Sri Lanka.

Key Points

• India shares land borders with several countries, including Pakistan, China, Nepal, Bhutan, Bangladesh, Afghanistan, and Myanmar.

• The question asks which country does NOT share a land border with India. Among the given options, Sri Lanka is the correct answer as it does not share a direct land border with India. Instead, it is separated from India by the Palk Strait.

• Sri Lanka is an island nation located in the Indian Ocean, just south of India. The narrow Palk Strait separates the two countries, making it impossible for Sri Lanka to have a land border with India. Hence, the correct answer is Sri Lanka.

• Afghanistan, although sharing a very small land border with India in the northwest, is officially recognized as one of the countries bordering India. Hence, Afghanistan is not the correct answer.

• China shares a significant land border with India in the north. This border includes regions such as Ladakh, Arunachal Pradesh, and Sikkim. Hence, China is not the correct answer.

• Myanmar shares a land border with India in the northeastern region, particularly in states such as Arunachal Pradesh, Nagaland, Mizoram, and Manipur. Hence, Myanmar is not the correct answer.

• Thus, the correct answer is Sri Lanka.

Additional Information

• India's Neighboring Countries:

• India shares its borders with seven countries: Pakistan, China, Nepal, Bhutan, Bangladesh, Myanmar, and Afghanistan.

• Pakistan: Shares a western border with India. The Radcliffe Line divides the two countries, established during the partition in 1947.

• China: Shares a northern border with India, including the disputed regions of Aksai Chin and Arunachal Pradesh.

• Bangladesh: Shares the longest land border with India, stretching over 4,096 kilometers.

• Myanmar: Located to the east of India, shares a border with Indian states like Arunachal Pradesh, Nagaland, Mizoram, and Manipur.

• Bhutan: Shares a border in the Himalayan region, particularly with the states of Sikkim, West Bengal, Arunachal Pradesh, and Assam.

• Afghanistan: India shares a small border with Afghanistan in the northwest, known as the Durand Line.

Important Points

• Geopolitical Significance:

• India's land borders are of strategic importance for security, trade, and cultural exchange. The borders with Pakistan and China are particularly sensitive due to historical disputes.

• India's maritime borders: Although Sri Lanka does not share a land border with India, the maritime boundary is crucial for trade and bilateral relations.

• Key Historical and Geographical Facts:

• Adam's Bridge: It is believed that the Ramayana epic mentions this land connection between India and Sri Lanka.

• Palk Strait: The narrow strait separating India and Sri Lanka is about 40 kilometers wide.

• Sri Lanka: Known for its rich cultural heritage, the island nation has historically been connected to India through trade, migration, and cultural exchange.

Q4. Answer: (a) To create a multilingual AI platform for real-time translation among Indian languages

The correct answer is To create a multilingual AI platform for real-time translation among Indian languages..

Key Points

• Bhashini Project Overview: The Bhashini project is a government initiative by the Indian Ministry of Electronics and Information Technology (MeitY). It aims to create a multilingual Artificial Intelligence (AI) platform designed for facilitating real-time translation

and interpretation across various Indian languages.

• This project is aligned with the vision of Digital India and aims to eliminate language barriers across the country by leveraging cutting-edge AI and machine learning technologies.

• Purpose: The primary goal is to ensure that people from all linguistic backgrounds in India can access digital content and services in their native languages. This supports the inclusion of individuals from different regions.

• Focus on Indian Languages: India is a linguistically diverse country with 22 scheduled languages and hundreds of dialects. The Bhashini project seeks to bridge the gap by creating a comprehensive multilingual ecosystem for communication, especially in regional languages.

• Components: The project includes the development of language datasets, APIs, and AI solutions to support translation, transcription, and interpretation services for Indian languages.

• Applications: The project can be applied to education, governance, e-commerce, healthcare, and other domains to ensure that people from different linguistic backgrounds can access necessary services and resources.

Additional Information

• Importance of Multilingual AI:

• India's linguistic diversity: With over 1.3 billion people speaking a variety of languages, a multilingual AI platform is crucial for fostering inclusivity and removing language as a barrier to communication and information access.

• Applications in public services: The platform can enable access to government services, education, and healthcare in local languages, ensuring that citizens from rural and remote areas are not left behind in the digital revolution.

• Economic impact: By allowing businesses to interact with customers in their native languages, the project can help boost local and regional economies.

• Government Initiatives Supporting Bhashini:

• Digital India Programme: Launched in 2015, this initiative aims to transform India into a digitally empowered society and knowledge economy. Bhashini complements this goal by breaking language barriers.

• Indian Language Internet Alliance (ILIA): An initiative aimed at increasing Indian language content on the internet, providing a digital space for local languages, which aligns with the Bhashini project.

Important Points

• Global Context:

• UNESCO: The United Nations Educational, Scientific and Cultural Organization (UNESCO) has emphasized the importance of language preservation and promotion for cultural diversity.

• AI in language technologies: Major companies like Google and Microsoft are also working on AI-powered translation tools, which further emphasizes the importance of multilingual technology.

• Future Prospects:

• The Bhashini project has the potential to position India as a global leader in language technology, fostering innovation and collaboration in this domain.

• It will also play a crucial role in preserving and promoting India’s rich linguistic heritage in the digital age.

Q5. Answer: (c) 0.685

The correct answer is 0.685.

Key Points

• Human Development Index (HDI): The HDI is a composite index used to measure and compare a country's development. It includes three major dimensions: health (life expectancy), education (mean years of schooling and expected years of schooling), and standard of living (GNI per capita).

• According to the 2025 UNDP Report, India's HDI value was recorded as 0.685. This value represents India's progress across the three dimensions: health, education, and living standards.

• The HDI value of 0.685 places India in the medium human development category. Hence, the correct answer is Option 3.

• India's HDI Growth: Over the years, India has seen steady progress in improving its HDI value due to initiatives targeting poverty alleviation, healthcare improvements, and educational reforms.

• The HDI value is calculated annually by the United Nations Development Programme (UNDP). It serves as a global benchmark to assess a country's development level. Hence, Option 3 is the correct answer.

Additional Information

• Human Development Index (HDI):

• Introduced by the United Nations Development Programme (UNDP) in 1990, the HDI provides a summary measure of human development.

• The HDI focuses on three dimensions: health, education, and living standards. It helps in assessing the social and economic development of a country.

• Key Components of HDI:

• Health: Measured by the life expectancy at birth, which indicates the average lifespan of individuals in a country.
• Education: Measured using the mean years of schooling for adults and the expected years of schooling for children.
• Standard of Living: Measured using the Gross National Income (GNI) per capita, adjusted for purchasing power parity.
• India's HDI Progress:
• India has shown consistent improvement in its HDI ranking over the years, reflecting efforts to enhance healthcare, education, and economic conditions.
• Initiatives such as Ayushman Bharat, Skill India Mission, and Digital India have contributed to better living standards and opportunities for growth.
• In the 2025 UNDP report, India's HDI value of 0.685 places it among countries with medium human development.

Important Points

• Global HDI Rankings:
• Countries are categorized into low, medium, high, and very high human development based on their HDI values.
• The highest HDI rankings are typically occupied by developed nations, such as Norway, Switzerland, and Ireland.
• India's Challenges:
• Despite improvements, India faces challenges like poverty, inequality, and healthcare infrastructure.
• Government schemes such as National Health Mission and Samagra Shiksha Abhiyan aim to address these issues.
• Improving HDI is crucial for sustainable development and achieving the Sustainable Development Goals (SDGs).

Q6. Answer: (b) Notification Area

The correct answer is Notification Area.

Key Points

• The Notification Area, also referred to as the system tray, is a key desktop element in Windows. It is located at the bottom-right corner of the desktop screen, near the taskbar.
• This area displays important system notifications, such as updates, security alerts, and application messages, ensuring users are informed about the system's status.
• It shows the date and time, which is an essential feature allowing users to keep track of their schedule directly from the desktop.
• The Notification Area also provides information about the status of background applications running on the system, such as antivirus programs, network connections, or battery status (on laptops).
• Hence, the correct answer is Notification Area.

Additional Information

• File Explorer:
• File Explorer is a tool used for navigating and managing files and folders on a Windows system.
• It does not display system notifications or the status of background applications.
• Example: Users can open, move, copy, or delete files using File Explorer.
• Start Menu:
• The Start Menu is the central hub for accessing programs, settings, and features of a Windows system.
• It is located on the bottom-left corner of the desktop and does not display system notifications or time.
• Example: The Start Menu is used to open applications or search for files on the computer.
• Control Panel:
• Control Panel is a Windows feature used for changing system settings and configurations.
• It allows users to modify settings such as network preferences, hardware configurations, and user accounts, but does not display system notifications.
• Example: Changing the display resolution or adding a printer is done via the Control Panel.

Important Points

• Features of the Notification Area:
• The Notification Area includes icons for system processes such as volume control, network status, battery level, and antivirus software.
• Users can customize which icons appear in the Notification Area via Taskbar Settings.
• It often provides quick access to specific settings by right-clicking on the icons.
• How Notifications Work:
• Notifications appear as pop-ups on the lower-right side of the screen, displaying important updates or alerts.
• Users can interact with these notifications by clicking on them, which often redirects to the respective application or setting.

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Q7. Answer: (a) Matters such as taxation, foreign exchange, land reforms, etc., which can be assigned to tribunals by legis...

The correct answer is Matters such as taxation, foreign exchange, land reforms, etc., which can be assigned to tribunals by legislation..

Key Points

• Article 323B of the Indian Constitution, introduced by the 42nd Amendment Act of 1976, empowers Parliament and state legislatures to establish tribunals for specific matters.

• The matters covered under Article 323B include taxation, foreign exchange, land reforms, ceiling on urban property, elections, and industrial and labour disputes.

• Tribunals established under Article 323B are intended to provide speedy and specialized justice in these domains. Hence, this option is correct.

• Option 2 mentions the appointment of Supreme Court judges, which is not covered under Article 323B. It is governed by Articles 124 and 217 of the Indian Constitution, making this option incorrect.

• Option 3 mentions recruitment and service conditions of public servants. This is a subject matter for tribunals under Article 323A, not Article 323B. Hence, this option is incorrect.

• Option 4 suggests that Article 323B covers only industrial disputes between employers and workers. However, Article 323B encompasses more subjects beyond just industrial disputes. Hence, this option is incorrect.

Additional Information

• Article 323B:

• Article 323B was introduced through the 42nd Constitutional Amendment Act of 1976, which aimed to strengthen the tribunal system in India for adjudication of specific matters.

• Matters covered under Article 323B include taxation, foreign exchange, industrial disputes, elections, land reforms, urban property ceilings, production, procurement, and distribution of foodstuffs, among others.

• The tribunals established under Article 323B are independent judicial bodies designed to provide speedy justice in specialized areas, reducing the burden on regular courts.

• Difference between Article 323A and Article 323B:

• Article 323A deals exclusively with tribunals for service matters related to recruitment and conditions of service of public servants.

• Article 323B covers a broader range of subjects, including taxation, industrial disputes, elections, and land reforms, among others.

• Unlike Article 323A, which allows only the Parliament to establish tribunals, Article 323B empowers both Parliament and state legislatures to create tribunals for matters listed therein.

• Tribunals in India:

• Tribunals play a key role in ensuring speedy and efficient justice in specific areas such as administrative disputes, taxation issues, and industrial matters.

• Examples of tribunals set up under Article 323B include the Income Tax Appellate Tribunal (for taxation matters) and the Central Administrative Tribunal (under Article 323A).

Important Points

• Key Provisions of Article 323B:

• Tribunals under Article 323B are expected to function independently, ensuring fair and expedient resolution of disputes in specialized areas.

• These tribunals have the power to adjudicate disputes, hear appeals, and enforce laws related to the matters listed in the article.

• The establishment of these tribunals is part of efforts to address the problem of judicial backlog and provide focused expertise in resolving disputes.

Q8. Answer: (b) Primary sector

The correct answer is Primary sector.

Key Points

• On the eve of India's independence in 1947, the primary sector was the largest employer of the Indian workforce. This sector includes agriculture, forestry, fishing, and other allied activities.

• The Indian economy was largely agrarian during British rule, with over 70% of the population dependent on agriculture for their livelihood.

• The economy was predominantly rural, with limited industrialization and negligible development in the secondary (manufacturing) and tertiary (services) sectors.

• The primary sector accounted for a substantial share of the national income, but it was characterized by low productivity, outdated technology, and a lack of investment.

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• The exploitation of Indian agriculture under British colonial policies, such as the zamindari system and high land revenue demands, further contributed to the dominance of the primary sector in terms of employment, as most of the population relied on subsistence farming.

• The secondary sector (industrial sector) was underdeveloped during colonial rule as the British policies discouraged the growth of Indian industries to ensure dependence on British manufactured goods.

• The tertiary sector, which includes services like trade, transport, and banking, was also underdeveloped and catered primarily to the needs of colonial administration and foreign trade.

• Thus, the majority of the Indian population at the time of independence was employed in the primary sector, and the economy was heavily dependent on agriculture. Hence, the correct answer is Primary sector.

Additional Information

• Primary Sector:

• The primary sector involves activities that are directly dependent on natural resources, such as agriculture, forestry, fishing, and mining.

• In India, before independence, a significant majority of the population was engaged in agriculture and allied activities as their primary source of livelihood.

• The primary sector contributed the most to India's Gross Domestic Product (GDP) during colonial rule, but it was marked by a lack of modernization and low productivity.

• Secondary Sector:

• The secondary sector includes industries that produce finished goods from raw materials, such as manufacturing, construction, and industrial production.

• During British rule, the secondary sector was underdeveloped as the colonial powers prioritized raw material extraction from India for industries in Britain, while deliberately restricting the growth of Indian industries.

• Examples include the decline of the Indian textile industry due to competition from British imports and the lack of capital investment in industrialization.

• Tertiary Sector:

• The tertiary sector includes services like trade, transport, banking, communication, and administration.

• During colonial rule, the tertiary sector primarily served the needs of the British administration and foreign trade, with limited contribution to the general population's employment.

• It was small in size compared to the primary sector and did not play a significant role in providing employment.

• Post-Independence Developments:

• After independence, efforts were made to diversify the economy by promoting industrialization and developing the secondary and tertiary sectors.

• Policies like the Five-Year Plans, establishment of Public Sector Undertakings (PSUs), and Green Revolution significantly contributed to reducing the over-reliance on agriculture.

• In recent years, the tertiary sector has emerged as the largest contributor to GDP, while the share of the primary sector has declined.

Important Points

• Agrarian Economy: India's economy during colonial rule was predominantly agrarian, with a majority of the population engaged in agriculture and related activities.

• Exploitation of Indian Agriculture: The British implemented exploitative systems like the zamindari system, which led to widespread poverty and low agricultural productivity.

• Limited Industrialization: The British policies hindered the development of industries in India, restricting employment opportunities in the secondary sector.

• Economic Transition: Post-independence, India witnessed a shift from an agrarian economy to a more diversified one, with significant growth in industrial and service sectors.

• Current Scenario: As of recent times, the tertiary sector has become the largest contributor to India's GDP, while the primary sector employs a lower percentage of the population compared to the past.

Q9. Answer: (d) product of force and time

The correct answer is product of force and time.

Key Points

• Impulse is defined as the product of force and the time interval over which the force acts. Mathematically, Impulse (J) = Force (F) × Time (t).

• Impulse is a vector quantity, as both force and time are involved. It has the same direction as the applied force.

• The SI unit of impulse is the Newton-second (Ns), which is equivalent to the unit of momentum.

• Impulse is closely related to the concept of momentum. According to the impulse-momentum theorem, impulse is equal to the

change in momentum of an object: J = Δp = m × Δv.

• Impulse is significant in analyzing collisions and impacts. For example, when a baseball bat hits a ball, the force exerted during the short time of contact changes the ball's momentum, which is described by impulse.

• The other options (rate of change of force, change in displacement, product of mass and velocity) are incorrect because they do not represent impulse. Rate of change of force is related to jerk, change in displacement is connected to distance, and product of mass and velocity is momentum, not impulse.

• Hence, the correct answer is product of force and time.

Additional Information

• Impulse and Momentum Theorem:

• The impulse-momentum theorem states that the impulse experienced by an object is equal to the change in its momentum.

• Mathematically, J = Δp = m × Δv, where J is impulse, Δp is the change in momentum, m is mass, and Δv is the change in velocity.

• This relationship is derived from Newton's second law (F = m × a), considering the time interval of the applied force.

• Applications of Impulse:

• Impulse is crucial in sports, such as cricket, baseball, and football, where players exert force for a short time to change the momentum of balls.

• It is used in designing safety equipment like airbags and helmets to reduce the effect of sudden impacts by increasing the time of collision.

• Impulse is also used in rocket propulsion, where gases are expelled over a short time to generate thrust.

• Examples:

• A soccer player kicking a ball applies a force for a short duration, generating an impulse that changes the ball's speed and direction.

• In car crashes, the sudden application of force can cause significant damage. Airbags reduce the impact force by increasing the time of collision, thereby reducing the impulse on the passengers.

Important Points

• Impulse Calculation:

• Impulse can be calculated using the formula J = F × t, where F is the force applied and t is the time duration of the force.

• If the force is not constant, impulse is calculated as the integral of force over the time interval: J = ∫F dt.

• Real-Life Examples:

• During a boxing match, the punch delivered by a boxer generates impulse that affects the opponent's momentum.

• When a tennis player hits the ball with a racket, the force exerted over a brief time changes the ball's velocity and direction.

Q10. Answer: (d) Babar

The correct answer is Babar.

Key Points

• The First Battle of Panipat took place on April 21, 1526. It marked the beginning of the Mughal Empire in India.

• The battle was fought between Babar, the founder of the Mughal Empire, and Ibrahim Lodi, the last Sultan of the Lodi dynasty. This statement is correct.

• Babar defeated Ibrahim Lodi, ending the rule of the Lodi dynasty and establishing the Mughal dynasty in India.

• The battle was significant as it introduced modern warfare techniques to India, including the use of gunpowder, artillery, and field tactics.

• Babar's forces were smaller in number compared to Ibrahim Lodi's army, but their superior strategy and advanced weaponry played a crucial role in their victory.

• The victory in this battle enabled Babar to lay the foundation of the Mughal Empire in India. Hence, the correct answer is Babar.

Additional Information

• The First Battle of Panipat:

• The battle was fought near Panipat, a town in present-day Haryana, India.

• Babar's army consisted of approximately 12,000 troops, while Ibrahim Lodi's force was significantly larger, numbering around 100,000 soldiers (including camp followers).

• Babar used innovative warfare techniques, such as the deployment of field artillery and the Tulughma (encircling tactics), which were not known to Indian armies at that time.

• Babar's Role and Legacy:

• Babar was a descendant of Timur on his father's side and Genghis Khan on his mother's side.

• He was invited by Daulat Khan Lodi, a regional governor under Ibrahim Lodi, to invade India and overthrow the Lodi ruler.

• After the victory in the First Battle of Panipat, Babar established the Mughal Empire, which ruled India for over three centuries.
• Ibrahim Lodi:
• Ibrahim Lodi was the last Sultan of the Lodi dynasty, which was the last dynasty of the Delhi Sultanate.
• He was known for his autocratic rule and alienated many of his nobles, which ultimately led to his downfall.
• Significance of the Battle:
• The battle was a turning point in Indian history as it marked the end of the Delhi Sultanate and the beginning of the Mughal Empire.
• Babar's victory demonstrated the importance of modern military technology and tactics in warfare.
• The battle also showcased the weakness of Indian armies in adapting to new military strategies and equipment.

Important Points

• Use of Gunpowder:
• The First Battle of Panipat is considered one of the earliest battles in India to involve the use of gunpowder firearms and field artillery.
• Babar's artillery, commanded by Ustad Ali and Mustafa, played a decisive role in the victory.
• Historical Context:
• The Lodi dynasty was already weakened by internal conflicts and discontent among its nobles.
• The battle was part of a larger struggle for power in North India during the early 16th century.
• Consequences:
• Babar's victory led to the establishment of the Mughal Empire, which became one of the most powerful empires in Indian history.
• The battle marked a shift in military tactics and weaponry in the Indian subcontinent.

Q11. Answer: (a) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points

• Madhya Pradesh became the first Indian state to introduce the Drone Promotion and Utilisation Policy, 2025.
• The policy aims to promote the use of drones in various sectors, including agriculture, industrial inspections, surveillance, disaster management, and healthcare delivery.
• It includes provisions to create a drone ecosystem in the state, which will foster innovation, research, and entrepreneurship. Hence, this initiative is a significant step towards technological advancement in Madhya Pradesh.
• The policy also focuses on training and skill development to create a workforce capable of handling drone operations and maintenance. It encourages collaboration between academic institutions and industries to build drone technology expertise.
• Madhya Pradesh’s initiative aligns with the Digital India campaign, contributing to the country’s vision of becoming a global hub for drone technology. Hence, the correct answer is Madhya Pradesh.

Additional Information

• Drone Technology and its Applications:
• Drones are unmanned aerial vehicles used for various applications, including remote sensing, aerial photography, and delivery services.
• In agriculture, drones can be used for crop monitoring, pesticide spraying, and soil analysis, improving productivity and efficiency.
• Drones are also critical in disaster management, helping with rescue operations, damage assessment, and relief distribution in affected areas.
• Government Regulations on Drones:
• The Directorate General of Civil Aviation (DGCA) introduced the Drone Rules, 2021, which simplify the process for owning and operating drones in India.
• The rules include provisions for online registration, reduced fees, and the creation of a Digital Sky platform to manage drone operations.
• The government aims to make India a global drone hub by 2030.
• Other States and Drone Initiatives:
• States like Jharkhand, Punjab, and Odisha are also exploring opportunities to integrate drones into their governance and development plans.
• These states focus on adopting drones for agriculture, healthcare, and infrastructure development.

Important Points

• Drone Promotion and Utilisation Policy Highlights:
• The policy includes measures to attract private investments in the drone industry, aiming to create a robust infrastructure for

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research and development.

• It emphasizes collaboration with industries to establish testing and certification facilities for drones, ensuring compliance with national and international standards.

• Global Drone Market:

• India is emerging as a key player in the global drone market, which is expected to grow significantly by 2025.

• The adoption of drone technology is accelerating across sectors such as defense, logistics, and healthcare, contributing to economic growth.

Q12. Answer: (b) Sardar Vallabhbhai Patel

The correct answer is Sardar Vallabhbhai Patel.

Key Points

• Sardar Vallabhbhai Patel, often referred to as the Iron Man of India, played a crucial role in the integration of princely states into the Indian Union after independence.

• At the time of India's independence in 1947, there were 562 princely states. These states were semi-independent entities, and their rulers were given the choice to join India, Pakistan, or remain independent. This created a complex challenge for the newly formed Indian government.

• Sardar Patel, as the first Deputy Prime Minister and Minister of Home Affairs of independent India, took charge of integrating these states into the Indian Union.

• He used a combination of diplomacy, negotiation, and strategic pressure to convince the rulers of princely states to accede to India. Patel was assisted by V.P. Menon, who played an instrumental role in drafting the agreements and facilitating the process.

• Patel persuaded the rulers to sign the Instrument of Accession, ensuring their states would become part of India while retaining autonomy in certain internal matters.

• His efforts led to the peaceful accession of most princely states, including large ones like Hyderabad, Junagarh, and Kashmir, which posed unique challenges.

• In cases where peaceful negotiations failed, Patel used military action, as seen in the police action in Hyderabad (Operation Polo) to integrate the state into India.

• Through his firm resolve and visionary leadership, Patel ensured the territorial integrity of the newly independent India, setting the foundation for a unified nation.

• Hence, the correct answer is Sardar Vallabhbhai Patel.

Additional Information

• Role of Sardar Vallabhbhai Patel:

• Known as the architect of Indian integration, Patel was responsible for bringing together the diverse princely states into the Indian Union in a short span of time.

• He used his skills in diplomacy and pragmatic decision-making to address complex political situations and avoid fragmentation of the country.

• Challenges faced during integration:

• Several princely states, including Hyderabad, Junagarh, and Kashmir, initially resisted accession to India. Patel's strategic approach ensured their peaceful or forceful integration.

• The use of military action, such as Operation Polo in Hyderabad, demonstrated Patel's resolve to preserve India's unity.

• Instrument of Accession:

• The Instrument of Accession was a legal document signed by the rulers of princely states agreeing to join India. This ensured that the sovereignty of India was upheld while granting some autonomy to the states.

• Legacy of Sardar Patel:

• Patel’s efforts ensured the creation of a politically stable and unified Indian state, which has been crucial for the country’s development.

• To honor his contributions, the Statue of Unity, the world’s tallest statue, was built in Gujarat in 2018.

Important Points

• BR Ambedkar:

• Known as the architect of the Indian Constitution, Ambedkar worked primarily on establishing a framework for governance and social justice in India.

• He did not play a direct role in the integration of princely states.

• Jawaharlal Nehru:

• As the first Prime Minister of India, Nehru focused on building the political and economic framework of the nation.

• Although he supported Patel in the integration process, Nehru’s role was more prominent in post-independence governance.

• Subhas Chandra Bose:

• Bose was a prominent leader in the Indian freedom struggle. He formed the Indian National Army to fight against British colonial rule.

• While his contributions to independence were immense, he did not play a direct role in post-independence state integration.

Q13. Answer: (d) Legalising widow remarriage

The correct answer is Legalising widow remarriage.

Key Points

• The Hindu Widows' Remarriage Act was enacted in 1856 during the British colonial rule in India.

• The primary objective of the law was to legalize the remarriage of Hindu widows, which was previously considered a social taboo and was prohibited in many communities.

• This law aimed to improve the social status and well-being of widows, who were often subjected to ill-treatment and societal discrimination in traditional Indian society.

• The enactment of this law was largely due to the efforts of prominent social reformers like Ishwar Chandra Vidyasagar, who advocated for the rights of widows and emphasized the need for their remarriage to ensure their dignity and well-being.

• This law marked a significant step in the social reform movement in India by challenging oppressive practices and promoting equality and justice for women.

• By legalizing widow remarriage, the Act also sought to combat the practice of sati (the self-immolation of widows) and other regressive traditions that marginalized women.

• The law faced resistance from conservative sections of society, but it laid the foundation for subsequent reforms in women's rights and social justice in India.

Additional Information

• Hindu Widows' Remarriage Act, 1856:

• The Act was passed on July 16, 1856, and it provided legal validity to the remarriage of widows in India.

• It was a landmark legislation that abolished the restrictions imposed by societal norms on widows, allowing them to remarry if they wished to.

• This law primarily focused on improving the social and economic conditions of widows, who were often forced into a life of poverty and isolation after the death of their husbands.

• Role of Ishwar Chandra Vidyasagar:

• Ishwar Chandra Vidyasagar was a prominent social reformer who played a key role in advocating for the passage of this Act.

• He highlighted the plight of widows and the need for their remarriage to ensure their dignity, security, and social acceptance.

• Vidyasagar's efforts, including his petitions to the British government and public campaigns, were instrumental in bringing about this reform.

Important Points

• Impact of the Hindu Widows' Remarriage Act:

• It encouraged the recognition of widows as individuals with rights and personal agency.

• The Act was a significant step towards gender equality and the upliftment of women in Indian society.

• It also paved the way for future reforms in the areas of women's rights, education, and social justice.

Q14. Answer: (b) Next Generation Administrative Reforms – Empowering Citizens and Reaching the Last Mile

The correct answer is Next Generation Administrative Reforms – Empowering Citizens and Reaching the Last Mile.

Key Points

• The theme of the IIAS-DARPG India Conference held in New Delhi in February 2025 was "Next Generation Administrative Reforms – Empowering Citizens and Reaching the Last Mile."

• The conference was focused on discussing and strategizing over innovative administrative reforms aimed at improving governance and citizen empowerment.

• The phrase "Next Generation Administrative Reforms" refers to reforms that leverage technology, innovative practices, and robust policies to create a transparent, efficient, and citizen-centric governance framework.

• The focus of the conference was on "Reaching the Last Mile," which emphasizes delivering services and benefits to the most marginalized and underserved sections of society.

• It addressed critical areas such as digital governance, administrative efficiency, policy-making innovations, and citizen participation in governance processes.

• The conference was jointly organized by the Indian Institute of Advanced Study (IIAS) and the Department of Administrative Reforms and Public Grievances (DARPG).

Additional Information

• India Conference by IIAS-DARPG:

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• The conference is an annual event that brings together policymakers, administrators, and experts to discuss and deliberate on critical administrative and governance reforms in India.

• The conference serves as a platform to exchange knowledge, share best practices, and identify innovative solutions to improve public service delivery and governance mechanisms.

• Importance of Administrative Reforms:

• Administrative reforms are crucial for enhancing efficiency, transparency, and accountability in governance and ensuring that government services reach all citizens equitably.

• They focus on improving decision-making processes, reducing bureaucratic red tape, and adopting technological solutions to streamline governance.

• Empowering Citizens and Reaching the Last Mile:

• This theme aligns with the Indian government's commitment to ensuring that the benefits of governance reach even the most remote and marginalized communities.

• It emphasizes the use of digital technologies and grassroots-level governance to bridge the gap between the government and citizens.

Important Points

• Digital Transformation in Governance:

• While digital transformation is a key enabler of governance reforms, the 2025 conference primarily revolved around the broader theme of next-generation administrative reforms.

• It included discussions on the integration of AI, big data, and other technological advancements to create a more inclusive governance ecosystem.

• Strengthening Federal Structures:

• Although strengthening federal structures is a critical aspect of governance, it was not the primary theme of the 2025 conference.

• Federalism is often discussed in the context of ensuring equitable distribution of resources and power between the central and state governments.

Q15. Answer: (a) Charter Act 1833

The correct answer is Charter Act 1833.

Key Points

• The Charter Act of 1833 was a significant legislative act passed by the British Parliament to reform the administration of British India.

• It marked the end of the trading functions of the East India Company and transformed it into an administrative body.

• The Act created the position of Governor-General of India, granting him both civil and military authority. This was a pivotal change, as it centralized power in India. Hence, this is the correct answer.

• The first Governor-General of India under this Act was Lord William Bentinck.

• The Act also allowed the Governor-General to pass laws for the entire country, thus marking a step toward legal and administrative centralization.

• It introduced the concept of an Indian Law Commission to codify laws in India.

Additional Information

• Charter Act of 1833:

• The Charter Act of 1833 was enacted to address administrative inefficiencies and provide centralized control over British India.

• It abolished the trading rights of the East India Company, making it purely an administrative and political entity.

• The creation of the Governor-General of India was an essential step in establishing British authority across the country.

• Significance of the Governor-General of India:

• The Governor-General had the authority to legislate for all territories under British control in India.

• The position centralized administrative power and introduced uniformity in governance.

• Other Related Acts:

• Regulating Act of 1773: It was the first attempt to regulate the affairs of the East India Company. However, it did not create the position of Governor-General of India but introduced the Governor-General of Bengal.

• Pitt's India Act of 1784: This Act strengthened British control over the East India Company's administration but did not create the Governor-General of India.

• Government of India Act 1858: This Act marked the transfer of control of India from the East India Company to the British Crown, further centralizing power but occurring after the Charter Act of 1833.

Important Points

• Impact of the Charter Act of 1833:

• The Act marked a significant shift in the governance model of British India, centralizing power under the Governor-General of

India.

• It also introduced measures to ensure the codification of laws and laid the foundation for modern legal systems in India.

• Relevance of Other Acts:

• The Regulating Act of 1773 and Pitt's India Act of 1784 were significant in establishing British control but did not centralize authority under a single Governor-General of India.

• The Government of India Act 1858 followed the Charter Act of 1833 and took steps to transfer power from the East India Company to the British Crown.

Q16. Answer: (b) State Legislatures

The correct answer is State Legislatures.

Key Points

• State Legislatures in India are primarily responsible for legislating on subjects listed in the State List as per the Seventh Schedule of the Indian Constitution.

• The State List contains matters of local and state importance, which the state governments have exclusive authority to legislate upon. Police, public health, and agriculture are some of the key subjects in this list.

• The subjects of police and law enforcement fall under the purview of the state legislatures, allowing states to regulate and manage law and order within their territory. Hence, police is legislated by the state governments.

• Similarly, public health is a critical area that states govern. This includes managing healthcare infrastructure, epidemic control, and sanitation facilities. Hence, public health is legislated by the state governments.

• Agriculture is another important subject under the State List. States have the authority to implement policies related to crop production, irrigation, and farmers' welfare. Hence, agriculture is legislated by the state governments.

• The Union Government, on the other hand, legislates on subjects mentioned in the Union List, such as defense, foreign affairs, and atomic energy, which are not within the state's jurisdiction. Hence, the Union Government does not legislate on these matters.

• The Inter-State Council is primarily a consultative body created under Article 263 of the Constitution to resolve disputes between states but does not legislate on state-specific matters. Hence, it does not legislate on these matters.

• Local Bodies, such as municipal corporations and panchayats, operate under the state governments and focus on governance at the grassroots level, but they do not enact legislation on subjects like police, public health, or agriculture. Hence, local bodies do not legislate on these matters.

• Hence, the correct answer is State Legislatures.

Additional Information

• State List under the Seventh Schedule:

• The State List includes subjects where states have exclusive powers to legislate. It comprises 61 subjects, such as police, public health, agriculture, water supply, and local government.

• Examples include laws related to criminal procedures, public order, hospitals, sanitation, and agricultural policies.

• Union List and Concurrent List:

• The Union List contains subjects where only the Union Government can legislate, such as defense, foreign affairs, and atomic energy.

• The Concurrent List includes subjects like education, forests, and marriage, where both the Union and State Governments can legislate.

• Legislative Framework in India:

• India follows a quasi-federal structure, with a clear division of powers between the Union and State Governments as per the Seventh Schedule of the Constitution.

• This ensures that states have autonomy in areas of local and regional importance while the Union Government oversees matters of national interest.

Important Points

• Judicial Interpretation:

• The Supreme Court has upheld the principle of exclusive legislation by states on subjects listed under the State List, emphasizing autonomy in areas like law enforcement and agriculture.

• Disputes between states and the Union regarding legislative powers are resolved through judicial interpretation based on the Constitution.

• Examples of State Legislation:

• Punjab Agricultural Produce Markets Act: A state law regulating agricultural markets and ensuring fair prices for farmers.

• Maharashtra Public Health Act: A law aimed at improving healthcare infrastructure and managing public health emergencies.

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Q17. Answer: (a) Nagaland

The correct answer is Nagaland.

Key Points

• The Hornbill Festival, also known as the "Festival of Festivals," is an annual cultural festival celebrated in the state of Nagaland.

• It is held every year in the first week of December, typically from December 1 to December 10, to coincide with Nagaland's Statehood Day, which is celebrated on 1st December.

• This festival is organized by the Government of Nagaland in Kisama Heritage Village, which is located about 12 km from Kohima, the state capital.

• In December 2024, the Hornbill Festival saw record-breaking participation from visitors across India and other countries, highlighting its growing popularity. Hence, Nagaland is the correct answer.

• The festival is a vibrant celebration of the rich cultural heritage, traditions, and tribal diversity of the people of Nagaland.

Additional Information

• Key Highlights of the Hornbill Festival:

• The festival is named after the Hornbill bird, which is considered a symbol of respect and cultural significance among the tribes of Nagaland.

• It showcases the culture, dances, music, crafts, and food of the 17 major tribes of Nagaland, along with many sub-tribes.

• Key activities include traditional dance performances, folk music, indigenous sports, art exhibitions, and a rock music festival that attracts bands from across the country and abroad.

• The festival also hosts a night bazaar, offering unique local crafts, handloom products, and traditional cuisine.

• Kisama Heritage Village:

• The venue of the Hornbill Festival, Kisama Heritage Village, is designed to represent the traditional houses and lifestyle of the Naga tribes.

• Each of the 17 major tribes of Nagaland has its own morung (traditional hut) in the village, showcasing their unique architectural styles and culture.

• Tourism Impact:

• The Hornbill Festival is a major tourist attraction, drawing visitors from across the world, and contributing significantly to the local economy.

• It provides a platform for the preservation and promotion of Naga culture, while also fostering unity among the diverse tribes of the state.

Important Points

• Importance of the Hornbill Festival:

• It plays a vital role in preserving the intangible cultural heritage of Nagaland and promoting its unique identity.

• The festival fosters unity among the different tribes of Nagaland by providing a common platform to showcase their cultures.

• The event is supported by the central and state governments to boost cultural tourism in the northeastern region of India.

• Other Festivals in Northeast India:

• Meghalaya: The Wangala Festival is a major celebration of the Garo tribe, marking the end of the harvest season.

• Manipur: The Sangai Festival highlights the state's culture, heritage, and the endangered Sangai deer.

• Assam: The Bihu Festival is the most popular festival in Assam, celebrating the agricultural cycle and seasons.

Q18. Answer: (d) 2026

The correct answer is 2026.

Key Points

• India-UK Free Trade Agreement (FTA) is a significant trade pact aimed at enhancing economic ties between India and the United Kingdom.

• The negotiation process for the India-UK FTA began in January 2022, with both nations aiming to conclude the talks within a reasonable timeframe.

• The agreement focuses on reducing trade barriers, enhancing investment opportunities, simplifying tariffs, and improving access to markets for both countries.

• According to official statements and reports, the FTA is expected to be fully implemented by 2026. This timeline aligns with the efforts to finalize negotiations and ensure all administrative processes are completed. Hence, the correct answer is 2026.

• The agreement is anticipated to significantly boost trade between India and the UK, fostering stronger economic cooperation. Hence, statement aligns with the correct option.

Additional Information

• India-UK Trade Relations:

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• The UK has been a significant trading partner of India, with bilateral trade valued at approximately £29.6 billion in 2022.

• India exports textiles, pharmaceuticals, gems and jewellery, machinery, and chemicals to the UK, while the UK exports machinery, scientific instruments, and engineering goods to India.

• Key Objectives of the FTA:

• The India-UK FTA aims to increase trade by reducing tariffs on goods like automobiles, Scotch whisky, and textiles.

• The pact seeks to enhance cooperation in areas such as services, investment, and intellectual property rights.

• Both nations aim to foster economic growth, create job opportunities, and strengthen ties in sectors like technology and renewable energy.

• Benefits Expected:

• The FTA will provide Indian exporters better access to the UK market, boosting growth in sectors like agriculture, textiles, and pharmaceuticals.

• For the UK, the agreement will enhance its presence in the growing Indian economy, especially in sectors like technology and manufacturing.

• The agreement is expected to increase bilateral investments and strengthen the cultural and economic partnership between the two nations.

Important Points

• Timeline for Implementation:

• While negotiations started in 2022, the complex nature of the agreement has necessitated a detailed approach to finalize the terms by 2026.

• Both nations are committed to expediting the process, but the administrative and legal approvals are expected to take a few years.

• Global Impact:

• The successful implementation of the India-UK FTA will serve as a model for other international trade agreements, showcasing the benefits of bilateral trade pacts.

• It will also strengthen India's position as a growing economic power and the UK’s role as a trade facilitator post-Brexit.

• The agreement aligns with India's vision to become a global export hub, while the UK aims to diversify its trade relations globally.

Q19. Answer: (c) Pradhan Mantri Kaushal Vikas Yojana 4.0

The correct answer is Pradhan Mantri Kaushal Vikas Yojana 4.0.

Key Points

• Pradhan Mantri Kaushal Vikas Yojana 4.0 (PMKVY 4.0) is a flagship scheme launched by the Government of India, aimed at providing free skill development training to youth across India, especially in rural areas.

• The scheme is implemented from FY 2022 to 2026, focusing on equipping individuals with industry-relevant skills to enhance employability. Hence, the statement is correct.

• PMKVY 4.0 emphasizes digital skills, aligning with the growing demand for technology-driven roles in the job market.

• The scheme targets rural youth, ensuring inclusivity by bridging the skill gaps in remote areas. It also focuses on marginalized groups, such as women and economically disadvantaged communities. Hence, this statement is correct.

• PMKVY 4.0 incorporates an extensive network of training centers across India, including partnerships with industries, organizations, and state governments to ensure effective implementation.

• The scheme is part of the government's Skill India Mission, aimed at achieving the larger goal of transforming India into the "Skill Capital of the World." Hence, statement is correct.

• Hence, the correct answer is Pradhan Mantri Kaushal Vikas Yojana 4.0.

Additional Information

• Skill Development Schemes in India:

• Skill India Mission: Launched in 2015, it aims to train over 40 crore people in India in different skills by 2022.

• Pradhan Mantri Kaushal Vikas Yojana (PMKVY): This scheme has seen multiple iterations, with PMKVY 4.0 being the latest, designed to meet current industry demands and empower youth.

• Features of PMKVY 4.0:

• Focuses on industry-relevant training, including digital, green, and emerging technologies.

• Provides certification and placement assistance to trainees.

• Encourages participation from women, minorities, and differently-abled individuals for equitable growth.

• Other Skill Development Schemes:

• Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY): Focuses on rural youth aged 15-35, providing skill training to boost employment in rural areas.

• Skill India 3.0: Focuses on digital literacy and upskilling existing workers.

Important Points

• PMKVY 4.0 Implementation:

• Implemented by Ministry of Skill Development and Entrepreneurship (MSDE) with the help of National Skill Development Corporation (NSDC).

• Focuses on creating a robust ecosystem for skill training and certification.

• Challenges Addressed:

• Bridges the gap between education and employment by emphasizing practical training.

• Addresses the issue of unemployment in rural and semi-urban regions.

Q20. Answer: (b) Gurindervir Singh, Animesh Kujur, Manikanta H, Amlan Borgohain

The correct answer is Gurindervir Singh, Animesh Kujur, Manikanta H, Amlan Borgohain.

Key Points

• Indian 4x100m Relay Team: The team comprising Gurindervir Singh, Animesh Kujur, Manikanta H, and Amlan Borgohain set a national record in the 4x100m event during the National Relay Carnival, 2025.

• This achievement showcases the team's exceptional coordination, speed, and athletic prowess, as the relay event requires seamless passing of the baton and consistent performance from all members.

• Amlan Borgohain: A prominent sprinter and part of the team, has been known for his record-breaking performances in domestic athletic events. Hence, the inclusion of his name is correct.

• National Relay Carnival: This carnival is a prestigious event in Indian athletics, where various teams compete to showcase their skills in relay races. The 4x100m is one of the most anticipated events during the carnival.

• The achievement of setting a national record further highlights the continuous improvement and rising standards of Indian athletes on the national and international stage. Hence, the correct answer is Gurindervir Singh, Animesh Kujur, Manikanta H, Amlan Borgohain.

Additional Information

• Overview of Relay Races:

• Relay races are track and field events in which teams of athletes run a sequence of legs, passing a baton from one runner to the next.

• The 4x100m relay is one of the most popular and fastest relay events globally, requiring exceptional sprinting ability and efficient baton exchanges.

• National Relay Carnival:

• The National Relay Carnival is an annual athletic event in India that focuses on team relay events, including 4x100m, 4x400m, and other variations.

• It serves as a platform for athletes to showcase their teamwork, coordination, and speed in competitive relay formats.

• Individual Achievements:

• Gurindervir Singh: Known for his consistent performances in national sprinting competitions.

• Animesh Kujur: An emerging talent in Indian athletics, contributing significantly to relay events.

• Manikanta H: A promising sprinter with a strong track record in relay races.

• Amlan Borgohain: Holds records in various sprinting categories and is one of India's fastest sprinters.

Important Points

• Significance of Relay Races:

• Relay races are crucial in athletics as they emphasize teamwork, coordination, and strategy alongside individual performance.

• The 4x100m relay is particularly significant as it tests speed and precision in baton exchanges, which often determine the outcome.

• India's Progress in Athletics:

• India has seen considerable improvement in athletics, with athletes setting national and international records in recent years.

• Efforts by organizations like the Athletics Federation of India have played a significant role in developing talent and improving infrastructure.

Q21. Answer: (a) Mouse

The correct answer is Mouse.

Key Points

• A mouse is a small hand-held pointing device that is used to control the movement of the cursor on a computer screen.

• The mouse operates in a two-dimensional motion, enabling the user to interact with objects on the screen by pointing, clicking, dragging, and dropping.

• It typically consists of buttons and a scroll wheel, which allow users to perform various functions such as selecting, scrolling, and

dragging. Hence, the correct answer is Mouse.

• The mouse can be connected to the computer via a wired connection or wirelessly, making it a convenient and versatile input device.

• It is the most commonly used pointing device for personal computers and is integral to graphical user interfaces (GUIs).

Additional Information

• Mouse:

• The mouse was invented by Douglas Engelbart in 1964, and it revolutionized the way users interact with computers.

• Modern mice come in various designs, including optical mice, laser mice, and wireless mice, offering enhanced precision and convenience.

• Applications: They are extensively used in applications requiring graphical interactions, such as gaming, designing, and general computer usage.

• Scanner:

• A scanner is used to convert physical documents or images into a digital format. It is not a pointing device.

• Functions: Scanners are commonly used for document digitization and image editing purposes.

• Touchscreen:

• A touchscreen is an input device that allows users to interact directly with the display by touching it. It is not a hand-held device like a mouse.

• Applications: Touchscreens are widely used in smartphones, tablets, ATMs, and kiosks.

• Keyboard:

• A keyboard is an input device used to type characters and commands into a computer. It is not a pointing device.

• Features: Keyboards have a variety of keys, including alphanumeric keys, function keys, and special keys.

Important Points

• Types of Mice:

• The mechanical mouse uses a rolling ball to detect movement and is one of the earliest types of mice.

• The optical mouse uses light sensors to track movement, offering greater precision and durability.

• The wireless mouse operates via Bluetooth or RF technology, offering portability and eliminating the hassle of cables.

• Evolution:

• In 1981, Xerox introduced the first commercial mouse with its computer system.

• Today, advanced mice are equipped with features such as programmable buttons and ergonomic designs for enhanced user experience.

Q22. Answer: (a) Pakistan

The correct answer is Pakistan.

Key Points

• Article 6 of the Indian Constitution addresses the citizenship of persons who migrated to India from Pakistan.

• This provision specifically applies to individuals who were born in undivided India and moved to India after the partition in 1947.

• It grants Indian citizenship to those who migrated from Pakistan before July 19, 1948, provided they or either of their parents were born in undivided India and had been residing in India since migration.

• For those who migrated after July 19, 1948, Indian citizenship is granted if they registered themselves as citizens of India under the prescribed procedure.

• The provision also specifies that the registration process must be conducted by an officer appointed by the Government of India.

• This article is part of the broader framework of the Constitution that defines citizenship at the commencement of the Constitution.

• It aims to address the displacement and migration caused by the partition of India, ensuring legal recognition of citizenship for affected individuals.

• Hence, the correct answer is Pakistan.

Additional Information

• Historical Context:

• The partition of India in 1947 led to large-scale migration between India and Pakistan due to religious and communal reasons.

• Millions of people moved across borders, creating a significant need for a legal framework to grant citizenship to migrants.

• Provisions under Article 6:

• Migrants who entered India before July 19, 1948, and lived in India since migration automatically qualified for citizenship.

• Those who migrated after this date were required to register themselves with the appropriate authority to obtain Indian citizenship.

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• The registration process required proof of residence in India and verification by the appointed officer.

• Key Legislative Acts:

• The Citizenship Act of 1955 further elaborates on the provisions of Article 6, detailing the process of acquiring Indian citizenship by migrants from Pakistan.

• The act also specifies other modes of acquiring citizenship, such as birth, descent, registration, and naturalization.

Important Points

• Key Features of Article 6:

• Article 6 was designed to provide a legal framework for determining citizenship for individuals affected by the partition.

• It ensures that people who migrated from Pakistan due to religious or political persecution are given the right to Indian citizenship.

• Impact of Partition on Citizenship:

• The partition led to the displacement of millions of people, necessitating legal measures to address their citizenship status.

• Article 6 played a crucial role in integrating migrants into the socio-political framework of India.

Q23. Answer: (d) Village assemblies were called Sabha and Ur

The correct answer is Village assemblies were called Sabha and Ur.

Key Points

• The Pallava and Pandya kingdoms were prominent dynasties in South India known for their administrative systems and unique governance. One of the common administrative features between them was the existence of village assemblies, termed as Sabha and Ur.

• Village Assemblies: Sabha and Ur were local self-governing bodies that managed village affairs, including resource distribution, judicial administration, and revenue collection. Hence, this statement is correct.

• Sabha: Sabha referred to an assembly of Brahmin villages (agraharas) and was responsible for handling religious and administrative matters in the village. This assembly was highly structured and worked based on committees. Hence, this was common in both kingdoms.

• Ur: Ur was the assembly of non-Brahmin villages, which handled administrative functions like managing agricultural lands, water resources, and solving disputes among villagers. This was also common to Pallava and Pandya kingdoms. Hence, this is correct.

• The existence of these village assemblies shows the decentralized governance system of both kingdoms, wherein local communities had significant autonomy in decision-making. Thus, this was a shared feature between the Pallava and Pandya kingdoms.

Additional Information

• Pallava Kingdom:

• Time Period: The Pallavas ruled from the 3rd century CE to the 9th century CE. They were primarily centered in the region of present-day Tamil Nadu.

• Achievements: The Pallavas were known for their architectural advancements, including the rock-cut temples of Mahabalipuram and the Kailasanatha temple in Kanchipuram.

• Administrative System: Their governance was characterized by strong central authority, yet local administration was effectively managed by village assemblies like Sabha and Ur.

• Pandya Kingdom:

• Time Period: The Pandyas ruled from the 6th century BCE to the 16th century CE. Their kingdom was located in the southern part of Tamil Nadu.

• Achievements: The Pandyas were known for their literature, art, and trade relations with countries like Rome and Southeast Asia.

• Administrative System: Similar to the Pallavas, the Pandyas also relied on village assemblies like Sabha and Ur for local governance. This decentralized system ensured efficient management of resources.

• Village Assemblies:

• The village assemblies played a significant role in ensuring that the administration of villages was carried out effectively. They were involved in matters like taxation, revenue collection, irrigation management, and resolving disputes.

• Sabha and Ur: These assemblies were the backbone of local governance during the Pallava and Pandya periods. They were highly structured and functioned through committees dedicated to specific tasks.

Q24. Answer: (c) 17

The correct answer is 17.

Key Points

• The Sustainable Development Goals (SDGs) were adopted at the United Nations Sustainable Development Summit, held in New York in September 2015.

• The SDGs are also referred to as the Global Goals. They are a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by the year 2030.

• There are a total of 17 SDGs, which address a wide range of global challenges, including poverty, inequality, climate change, environmental degradation, peace, and justice. Hence, the correct option is 17.

• Each goal has specific targets to be achieved, with a total of 169 targets across all the goals, making them comprehensive and interconnected in nature.

• The SDGs succeeded the Millennium Development Goals (MDGs), which were in place from 2000 to 2015. The SDGs were designed to be more inclusive and detailed compared to the MDGs.

• The SDGs emphasize collaboration among governments, international organizations, and global stakeholders to achieve sustainable development worldwide.

• The 17 SDGs include goals like No Poverty, Zero Hunger, Quality Education, Gender Equality, Climate Action, and Partnerships for the Goals, among others.

Additional Information

• The 17 Sustainable Development Goals:

• Goal 1: No Poverty – Focuses on ending poverty in all its forms everywhere.

• Goal 2: Zero Hunger – Aims to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture.

• Goal 3: Good Health and Well-being – Ensures healthy lives and promotes well-being for all at all ages.

• Goal 4: Quality Education – Ensures inclusive and equitable quality education and promotes lifelong learning opportunities for all.

• Goal 5: Gender Equality – Achieves gender equality and empowers all women and girls.

• Goal 6: Clean Water and Sanitation – Ensures availability and sustainable management of water and sanitation for all.

• Goal 7: Affordable and Clean Energy – Ensures access to affordable, reliable, sustainable, and modern energy for all.

• Goal 8: Decent Work and Economic Growth – Promotes sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

• Goal 9: Industry, Innovation, and Infrastructure – Builds resilient infrastructure, promotes inclusive and sustainable industrialization, and fosters innovation.

• Goal 10: Reduced Inequalities – Reduces inequality within and among countries.

• Goal 11: Sustainable Cities and Communities – Makes cities and human settlements inclusive, safe, resilient, and sustainable.

• Goal 12: Responsible Consumption and Production – Ensures sustainable consumption and production patterns.

• Goal 13: Climate Action – Takes urgent action to combat climate change and its impacts.

• Goal 14: Life Below Water – Conserves and sustainably uses the oceans, seas, and marine resources.

• Goal 15: Life on Land – Protects, restores, and promotes sustainable use of terrestrial ecosystems, manages forests, combats desertification, and halts biodiversity loss.

• Goal 16: Peace, Justice, and Strong Institutions – Promotes peaceful and inclusive societies, provides access to justice for all, and builds effective, accountable institutions.

• Goal 17: Partnerships for the Goals – Strengthens the means of implementation and revitalizes the global partnership for sustainable development.

• Importance of SDGs:

• The SDGs are crucial for addressing the global challenges that include poverty, inequality, climate change, and environmental degradation.

• They are a part of the 2030 Agenda for Sustainable Development, which was adopted by all United Nations Member States in 2015.

• The SDGs call for a collaborative approach where nations, private sectors, and civil society work together to achieve global sustainable development.

Q25. Answer: (a) Wider and formed by alluvial deposits

The correct answer is Wider and formed by alluvial deposits..

Key Points

• The Eastern Coastal Plain of India is characterized by being wider compared to the Western Coastal Plain. It stretches along the eastern coastline, spanning areas like Tamil Nadu, Andhra Pradesh, Odisha, and West Bengal.

• It is primarily formed by alluvial deposits, which are sediments carried by rivers such as the Godavari, Krishna, and Mahanadi. These deposits make the region fertile and suitable for agriculture. Hence, statement 1 is correct.

• The Eastern Coastal Plain does not have numerous estuaries, unlike the Western Coastal Plain, which is known for estuarine formations due to the interaction of rivers with the Arabian Sea. Hence, statement 2 is incorrect.

• The Eastern Coastal Plain is not located between the Western Ghats and the Arabian Sea. Instead, it lies between the Eastern Ghats and the Bay of Bengal. Hence, statement 3 is incorrect.

• Unlike the Western Coastal Plain, the Eastern Coastal Plain is not narrow and rocky. Its wider and more fertile nature is due to the deposition of river sediments. Hence, statement 4 is incorrect.

• Hence, the correct answer is Option 1: Wider and formed by alluvial deposits.

Additional Information

• Eastern Coastal Plain Features:

• The Eastern Coastal Plain is a low-lying region that extends from West Bengal in the north to Tamil Nadu in the south.

• The plain is divided into two parts: the Northern Circar (covering Odisha and Andhra Pradesh) and the Coromandel Coast (covering Tamil Nadu).

• Major rivers such as the Mahanadi, Godavari, Krishna, and Kaveri flow into the Bay of Bengal, forming fertile deltas.

• The region is a hub for agriculture due to its fertile soil, which supports crops like rice, sugarcane, and groundnuts.

• Comparison with the Western Coastal Plain:

• The Western Coastal Plain is narrower and has rocky terrain, while the Eastern Coastal Plain is wider and has fertile soils.

• The Western Coastal Plain has numerous estuaries formed by rivers like the Narmada and Tapi, unlike the Eastern Coastal Plain.

• Bay of Bengal Interaction:

• The Eastern Coastal Plain interacts with the Bay of Bengal, leading to the formation of deltas and coastal wetlands.

• Cyclones are common in the region, impacting states like Odisha and Andhra Pradesh.

Important Points

• Major Deltas:

• The Eastern Coastal Plain is known for its deltas, including the Sundarbans Delta (formed by the Ganga and Brahmaputra rivers) and the Godavari-Krishna Delta.

• These deltas are crucial for biodiversity and support large populations dependent on agriculture and fishing.

• Coastal Ecology:

• The plain features coastal ecosystems like mangroves, estuaries, and lagoons, which are vital for maintaining ecological balance.

• The region faces challenges like erosion, sea-level rise, and cyclones, which require sustainable management practices.

Q26. Answer: (b) Defence Research and Development Organisation and Indian Navy

The correct answer is Defence Research and Development Organisation and Indian Navy.

Key Points

• Defence Research and Development Organisation (DRDO), in collaboration with the Indian Navy, successfully conducted the combat firing of the Multi-Influence Ground Mine (MIGM) in May 2025.

• The MIGM is an advanced naval mine that uses multiple sensors to detect and target enemy vessels. It is a critical component of India's coastal defense strategy.

• The successful testing of the MIGM showcases India's growing capabilities in developing cutting-edge defense technologies indigenously.

• The test was conducted as part of efforts to enhance the operational readiness of the Indian Navy and ensure the security of India's maritime borders.

• The DRDO, a premier research and development organization under the Ministry of Defence, is responsible for developing advanced defense systems and technologies to strengthen India's self-reliance in defense production.

• The Indian Navy has been actively collaborating with the DRDO to enhance its maritime capabilities, ensuring the safety and security of India's coastline and exclusive economic zones.

• The success of the MIGM combat firing test signifies a step forward in India's "Make in India" initiative, which emphasizes indigenous defense production and self-reliance.

Additional Information

• Defence Research and Development Organisation (DRDO):

• Established in 1958, the DRDO works under the Ministry of Defence to enhance India's self-reliance in defense systems.

• It has developed a wide array of defense equipment, including missiles, radars, electronic warfare systems, and naval platforms.

• DRDO focuses on cutting-edge technologies such as artificial intelligence, cyber defense, and advanced materials.

• Indian Navy:

• The Indian Navy is a critical branch of the Indian Armed Forces responsible for safeguarding the nation's maritime interests.

• It is one of the largest and most modern navies in the world, with a focus on securing India's maritime borders and ensuring the safety of sea lanes.

• The Navy operates a wide range of warships, submarines, and aircraft and is actively engaged in modernization efforts to

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enhance its capabilities.

• Multi-Influence Ground Mine (MIGM):

• The MIGM is a type of naval mine equipped with multiple sensors, such as acoustic, magnetic, and pressure sensors, to detect and target enemy ships and submarines.

• It is designed to be deployed on the seabed, making it difficult to detect and neutralize.

• The mine is a crucial component of anti-submarine warfare and coastal defense operations.

• Make in India Initiative:

• Launched in 2014, the initiative aims to transform India into a global manufacturing hub and boost self-reliance in various sectors, including defense.

• It encourages domestic manufacturing, innovation, and investment in key industries.

Important Points

• Significance of Indigenous Defense Development:

• Developing indigenous defense technologies reduces dependency on foreign imports and enhances national security.

• It contributes to economic growth by creating jobs and fostering innovation within the country.

• India's Naval Modernization:

• India has been focusing on upgrading its naval capabilities to address maritime security challenges in the Indian Ocean Region (IOR).

• Projects like the Indigenous Aircraft Carrier (IAC) and the Strategic Partnership (SP) model are part of these modernization efforts.

• Global Context:

• With increasing geopolitical tensions in the Indo-Pacific region, the development of advanced naval technologies like the MIGM is vital for maintaining regional stability.

Q27. Answer: (a) Rajasthan

The correct answer is Rajasthan.

Key Points

• Kathputli is a traditional form of puppetry that originates from the state of Rajasthan, India.

• The word 'Kathputli' is derived from two words: 'Kath' meaning wood and 'Putli' meaning doll, which literally translates to wooden doll.

• It is one of the oldest forms of puppetry in India and is deeply rooted in the culture and traditions of Rajasthan.

• The puppets are traditionally made of mango wood and dressed in vibrant, colorful Rajasthani attire to represent characters from Indian folklore and mythology.

• Kathputli performances often include storytelling, music, and dance, with themes revolving around legendary tales, moral stories, and historical narratives.

• The puppeteer, known as the 'Bhat community' in Rajasthan, manipulates the strings attached to the puppets, creating lifelike movements and expressions.

• The art of Kathputli is an intangible cultural heritage and is celebrated for preserving Rajasthani culture through its vibrant performances. Hence, Rajasthan is the correct answer.

Additional Information

• Other Options:

• Assam: Assam is known for its traditional dance forms like Bihu and Sattriya, but it does not have a puppetry tradition similar to Kathputli.

• Odisha: Odisha is famous for its, which is a shadow puppetry form, different from string puppetry like Kathputli.

• Kerala: Kerala is renowned for its Tholpavakoothu, a traditional shadow puppetry art form associated with the epic Ramayana.

• Important Characteristics of Kathputli:

• Kathputli puppets are usually wooden dolls with no legs, adorned with intricate costumes and jewelry.

• The stories often draw from Indian mythology, folklore, and social issues, conveying moral lessons and cultural values.

• Music and songs, particularly using Rajasthani instruments like the dholak and sarangi, form an integral part of Kathputli performances.

• Preservation Efforts:

• Due to the influence of modern entertainment, efforts are being made to preserve this art form through cultural festivals and government initiatives.

• UNESCO recognizes Kathputli as an intangible cultural heritage, highlighting its importance in the global cultural landscape.

Important Points

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• Historical Significance:

• The art of Kathputli dates back over 1000 years and was initially performed to entertain royalty and spread socio-cultural messages.

• The stories often reflect the Rajput culture, bravery, and valor, making it an important medium of cultural preservation.

• Modern Adaptations:

• Kathputli has found its way into modern media, including films, television, and theatre, bringing it to a global audience.

• Efforts by organizations like UNESCO and Indian cultural bodies aim to revive and sustain this traditional art form.

Q28. Answer: (c) Barren and wasteland

The correct answer is Barren and wasteland.

Key Points

• According to the Ministry of Agriculture data from 1950–51 to 2014–15, the land use category of barren and wasteland has shown a declining trend.

• This decline is primarily due to the efforts towards converting barren and wasteland into usable land for agriculture, afforestation, and other developmental purposes. Hence, the correct option is barren and wasteland.

• The other options like net sown area, forest area, and area under non-agricultural use have not shown the same consistent declining trend when analyzed over the same period. For example, forest areas have increased due to afforestation efforts, and non-agricultural land use has expanded with urbanization and industrialization. Hence, these options are incorrect.

• The decline in barren and wasteland is a result of the government's initiatives to enhance productive land use and reduce the amount of unutilized land.

Additional Information

• Barren and Wasteland:

• Barren and wasteland refers to land that is unproductive, uninhabited, or underutilized due to harsh environmental factors or lack of resources.

• Efforts have been made to convert this land into arable land through afforestation, soil conservation, and other land reclamation activities.

• The government has also promoted measures such as the Integrated Wasteland Development Programme (IWDP) and the National Afforestation Programme (NAP) to reduce wasteland and increase its utility.

• Net Sown Area:

• The net sown area refers to the total area sown with crops during the agricultural year. It has seen fluctuating trends but not consistent declines, as efforts have been made to expand agricultural areas.

• The net sown area forms a significant portion of India’s total geographical area, contributing to agricultural productivity.

• Forest Area:

• The forest area has increased over the years due to reforestation and afforestation projects under initiatives like the National Afforestation Programme and the National Mission for a Green India.

• Area under Non-Agricultural Use:

• With rapid urbanization and industrialization, the area under non-agricultural use, including construction, roads, and other infrastructure, has increased over the years.

• This trend is opposite to that of barren and wasteland, which has declined during the same period.

Important Points

• Government Initiatives to Reclaim Wasteland:

• The Integrated Wasteland Development Programme (IWDP) focuses on the development of wastelands in non-forest areas aimed at checking land degradation, conserving soil and moisture, and improving the land’s productivity.

• Under the National Afforestation Programme (NAP), efforts are made to enhance forest and tree cover to combat climate change, conserve biodiversity, and restore degraded lands.

• Impact of Land Use Changes:

• The reduction of barren and wasteland contributes to increased agricultural land, enhanced vegetation cover, and better ecological balance.

• It also plays a role in the socio-economic development of rural areas by providing more land for productive purposes.

Q29. Answer: (b) 1827

The correct answer is 1827.

Key Points

• Andre-Marie Ampère, a French physicist and mathematician, is best known for his groundbreaking work in the field of electrodynamics, which laid the foundation for modern electromagnetism.

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• In 1827, Ampère published his magnum opus titled “Mathematical Theory of Electrodynamic Phenomena Deduced Solely from Experiments”, which is considered one of the most significant contributions to the study of electricity and magnetism.

• This work provided a complete theoretical framework for understanding the interaction of electric currents and magnetic fields, marking the beginning of the field of electrodynamics. Hence, the correct year is 1827.

• Andre-Marie Ampère's name is immortalized in the unit of electric current, the Ampere, which is a testament to his lasting impact on physics.

• The other options like 1833, 1818, and 1811 are incorrect because they do not correspond to the publication year of this significant work.

Additional Information

• About Andre-Marie Ampère:

• Andre-Marie Ampère (1775–1836) was a pioneer in the study of electromagnetism and is often considered the father of electrodynamics.

• He formulated the Ampère's law, which mathematically describes the magnetic force between two electric currents.

• About the Magnum Opus:

• Ampère's book “Mathematical Theory of Electrodynamic Phenomena” was a pioneering work that included experimental results and theoretical analysis of electric currents and magnetic fields.

• This publication firmly established the field of electrodynamics and introduced key concepts that influenced later scientists like James Clerk Maxwell.

• Contributions to Science:

• Ampère's work demonstrated that two wires carrying electric currents exert a force on each other, which could be attractive or repulsive depending on the direction of the currents.

• He introduced the concept of the electrodynamic molecule, which was an early attempt to describe magnetic phenomena at the molecular level.

• About the Ampere (Unit):

• The SI unit of electric current, the Ampere, is named after Andre-Marie Ampère in recognition of his contributions to the field of electromagnetism.

• One Ampere is defined as the constant current that, when maintained in two straight parallel conductors of infinite length and negligible cross-section placed one meter apart in a vacuum, would produce a force of 2 × 10^(-7) newtons per meter of length between the conductors.

Important Points

• Electrodynamics:

• Electrodynamics is the branch of physics that studies the interaction between electric currents and magnetic fields. It forms the basis of many modern technologies, including electric motors and generators.

• Ampère's contributions to electrodynamics influenced the work of later scientists, including Michael Faraday and James Clerk Maxwell, who further developed the understanding of electromagnetism.

• Historical Significance:

• The publication of Ampère's work in 1827 marked a turning point in the study of physics, leading to a deeper understanding of electromagnetic forces and their applications in technology.

• His discoveries paved the way for the development of electrical engineering and technologies such as telecommunications, power generation, and electronic devices.

Q30. Answer: (b) for the discovery of heavy hydrogen

The correct answer is for the discovery of heavy hydrogen.

Key Points

• Harold C. Urey was awarded the Nobel Prize in Chemistry in 1934.

• The award was given for his discovery of heavy hydrogen, also known as deuterium.

• Heavy hydrogen (deuterium) is an isotope of hydrogen with one neutron in addition to the single proton in the nucleus of the atom, making it heavier than regular hydrogen. Hence, the statement is correct.

• The discovery of deuterium was a breakthrough in the field of isotopes, contributing significantly to the understanding of atomic structures and nuclear chemistry.

• Urey’s discovery laid the foundation for advancements in nuclear reactions and studies of the behavior of isotopes in chemical processes. Hence, the discovery is of paramount importance.

• The discovery also had practical applications, such as in nuclear power, thermonuclear reactions, and as a tracer in biological and chemical research.

Additional Information

• About Harold C. Urey:

• Harold Clayton Urey (1893–1981) was an American physical chemist and a pioneer in the study of isotopes.

• He discovered deuterium in 1931 and subsequently received the Nobel Prize for this significant achievement.

• Urey's work also contributed to the development of the Manhattan Project, which focused on nuclear weapon development during World War II.

• About Heavy Hydrogen (Deuterium):

• Deuterium is a naturally occurring isotope of hydrogen, with a nucleus composed of one proton and one neutron.

• It is found in small amounts in water molecules, which are referred to as heavy water when enriched with deuterium.

• Applications: Used in nuclear reactors, biological research, and spectroscopic studies.

• Significance of Nobel Prize in Chemistry:

• The Nobel Prize in Chemistry recognizes groundbreaking discoveries that contribute to the advancement of science and practical applications globally.

• Urey's recognition highlighted the importance of isotope chemistry in modern scientific progress.

Important Points

• Characteristics of Isotopes:

• Isotopes are variants of elements with the same atomic number but different mass numbers due to the presence of varying numbers of neutrons.

• Deuterium is a stable isotope of hydrogen and does not undergo radioactive decay.

• Heavy Water (D_2O):

• Heavy water is water in which the hydrogen atoms have been replaced with deuterium atoms.

• Uses: Heavy water is a crucial moderator in nuclear reactors and is used in neutron scattering experiments.

Q31. Answer: (a) Repo rate

The correct answer is Repo Rate.

Key Points

• Repo Rate is the primary instrument used by the Reserve Bank of India (RBI) for monetary policy implementation, especially in the post-1991 reform era.

• The Repo Rate refers to the rate at which the RBI lends money to commercial banks in the short term, usually against government securities.

• By increasing or decreasing the Repo Rate, the RBI influences the liquidity in the banking system and controls inflation or stimulates economic growth. Hence, statement 1 is correct.

• The tools mentioned in the other options, such as Export Incentives, Tariff Rates, and Direct Taxes, are primarily fiscal policy measures, not monetary policy instruments. Hence, these options are incorrect.

• In the post-1991 economic reforms, the RBI shifted its focus to indirect tools like the Repo Rate to efficiently manage monetary policy. The use of direct instruments, such as Cash Reserve Ratio (CRR), has decreased in importance. Hence, the correct answer is Repo Rate.

Additional Information

• Repo Rate:

• Repo Rate is an important tool of monetary policy used by central banks globally, including the RBI, to regulate liquidity and inflation.

• In India, the RBI adjusts the Repo Rate depending on the economic situation. For instance, the rate is lowered during recessions to encourage borrowing and spending, while it is increased during inflationary periods to curb excessive liquidity.

• During the pandemic, the RBI lowered the Repo Rate to support economic activity and provide relief to borrowers.

• Fiscal Policy vs Monetary Policy:

• Fiscal Policy involves government spending and taxation measures, such as Direct Taxes and Export Incentives, to influence economic conditions.

• Monetary Policy, managed by the RBI, includes tools like Repo Rate, Reverse Repo Rate, and Open Market Operations to control inflation, ensure price stability, and regulate the money supply.

• Direct Taxes and Tariff Rates:

• Direct Taxes are levied directly on income or profits, such as Income Tax and Corporate Tax. These are fiscal measures and not used for monetary policy implementation.

• Tariff Rates are used to influence international trade and are part of fiscal policy rather than monetary policy.

Important Points

• Repo Rate in India:

• The Repo Rate is determined by the Monetary Policy Committee (MPC), which was constituted under the RBI Act of 1934.

• The MPC meets bi-monthly to assess economic conditions and decide on the Repo Rate adjustments.

• Current Repo Rate (as of October 2023): 6.5% (subject to change depending on inflation and economic trends).

• Impacts of Repo Rate Changes:

• An increase in the Repo Rate leads to higher borrowing costs for commercial banks, reducing liquidity in the economy.

• A decrease in the Repo Rate encourages borrowing, boosts liquidity, and stimulates economic growth.

Q32. Answer: (b) Colonial agrarian economy

The correct answer is Colonial agrarian economy.

Key Points

• India's economy during the time of independence in 1947 was primarily an agrarian economy. This means that agriculture was the dominant sector, employing around 85% of the population.

• The British colonial rulers had established an exploitative economic system that focused on extracting resources from India and exporting raw materials to Britain.

• The British introduced the zamindari system (land revenue system), which led to the exploitation of farmers. Farmers were heavily taxed, and many were left in poverty.

• The colonial economy was structured in a way that hindered industrial development in India. Instead, it promoted the imports of British manufactured goods, creating an imbalance in trade.

• The economy lacked significant industrialization, with limited development in sectors like textiles, steel, and other manufacturing industries. As a result, India depended heavily on agriculture.

• The infrastructure, such as railways and communication systems, introduced by the British was largely meant to serve their own administrative and economic interests, such as the transportation of raw materials.

• By the time of independence, India had a low per capita income, high levels of poverty, and widespread unemployment, which were the result of prolonged colonial exploitation. Hence, the correct answer is "Colonial agrarian economy."

Additional Information

• Features of Colonial Agrarian Economy:

• The economy was predominantly rural, with the majority of people engaged in subsistence agriculture.

• India became a supplier of raw materials like cotton, jute, and spices to British industries and a market for their finished goods.

• There was a lack of modern agricultural technology, leading to low productivity and frequent famines.

• The zamindari system and other land revenue systems caused widespread exploitation of farmers by landlords and moneylenders.

• Impact of Colonial Rule on India’s Economy:

• The Indian economy faced deindustrialization, particularly in the traditional handicrafts and textile industries.

• The drain of wealth theory, as explained by Dadabhai Naoroji, highlighted how resources were extracted from India to enrich Britain.

• The lack of capital investment in industries and infrastructure for the benefit of Indians left the country economically backward.

• Contrasting Economic Systems:

• Import substitution industrialization: Adopted later in India post-independence to reduce dependency on imports and promote domestic industries.

• Global free market: India did not adopt this system at the time of independence, as the focus was on self-reliance and economic recovery.

• Socialist planned economy: This system was introduced in India after independence with the adoption of the Five-Year Plans starting in 1951.

Important Points

• The British policies resulted in stagnant economic growth, with the agricultural sector unable to sustain the growing population.

• The per capita income during the colonial period barely increased, and the standard of living of the average Indian deteriorated.

• The colonial economy left India with a legacy of poverty, high illiteracy rates, and underdeveloped industries, which the country had to address post-independence.

Q33. Answer: (c) Appointing a Prime Minister when no party has a clear majority

The correct answer is Appointing a Prime Minister when no party has a clear majority.

Key Points

• Discretionary powers of the President of India: The President of India holds discretionary powers, which are exercised only under certain circumstances. These powers allow the President to act without the advice of the Council of Ministers.

• When no political party secures a clear majority in the Lok Sabha, the President has the authority to use his/her discretion in

appointing the Prime Minister. Hence, appointing a Prime Minister when no party has a clear majority is a discretionary power.

• The President may invite the leader of the largest party or coalition to form the government, provided they can prove majority support in the Lok Sabha.

• Other situations where the President exercises discretionary powers include dismissing a government when it loses majority and recommending the dissolution of Lok Sabha if no viable government can be formed.

• The President does not have the discretion to dissolve the Lok Sabha without the advice of the Council of Ministers. This is governed by Article 85 of the Constitution. Hence, statement 1 is incorrect.

• Appointing the Chief Justice of India is not a discretionary power. The President appoints the Chief Justice based on established conventions and recommendations from the judiciary. Hence, statement 2 is incorrect.

• Giving assent to a Money Bill is not a discretionary power of the President. Under Article 110, the President can only approve or reject a Money Bill but cannot return it for reconsideration. Hence, statement 4 is incorrect.

• Therefore, the correct answer is Appointing a Prime Minister when no party has a clear majority.

Additional Information

• Discretionary Powers of the President:

• Discretionary powers are exercised by the President in situations where the advice of the Council of Ministers is not available or applicable.

• Examples include appointing the Prime Minister when no party secures a majority in the Lok Sabha or dissolving the Lok Sabha when no viable government can be formed.

• Appointment of Prime Minister:

• When no single party achieves a majority, the President invites the leader of the largest coalition or party to form the government.

• The appointed Prime Minister must prove majority support in the Lok Sabha within a stipulated time frame.

• Example: In 1989, when no party achieved a majority, then President R. Venkataraman appointed V. P. Singh as Prime Minister after consultation with various leaders.

• Constitutional Provisions:

• Article 75: It states that the President appoints the Prime Minister and other members of the Council of Ministers.

• Article 85: The President summons, prorogues, and dissolves the Lok Sabha based on the advice of the Council of Ministers.

• The President's discretionary powers are used in exceptional circumstances, ensuring the democratic process is upheld.

Important Points

• Key Features of Discretionary Powers:

• The discretionary powers of the President are limited and are exercised only in rare situations like a hung parliament or no clear majority.

• These powers are intended to maintain the smooth functioning of parliamentary democracy and ensure governance continuity.

• Historical Examples:

• 1996: After the general elections, then-President Shankar Dayal Sharma appointed A. B. Vajpayee as Prime Minister for 13 days when BJP emerged as the single largest party but failed to prove majority.

• 1989: When Congress lost the majority, President R. Venkataraman appointed V. P. Singh as Prime Minister, who later proved his majority in the Lok Sabha.

Q34. Answer: (b) India and Sri Lanka

The correct answer is India and Sri Lanka.

Key Points

• The Gulf of Mannar is a shallow bay area located in the Indian Ocean. It lies between the southeastern coast of India and the northwestern coast of Sri Lanka.

• It is part of the larger Laccadive Sea and is a well-known marine biodiversity hotspot, with rich coral reefs, seagrass beds, and marine ecosystems.

• The Gulf of Mannar is separated from the Palk Strait by the Rameswaram Island and the Adam's Bridge (also known as Ram Setu), a chain of limestone shoals connecting India and Sri Lanka. This confirms that the Gulf of Mannar lies between India and Sri Lanka.

• The Gulf of Mannar Biosphere Reserve, established in 1989, covers an area of around 10,500 square kilometers. It is India's first marine biosphere reserve, protecting the rich biodiversity of this region.

• The area is known for its high ecological importance, being home to over 3,600 species of marine flora and fauna, including endangered species like the Dugong (sea cow).

• The Gulf of Mannar is also historically significant due to its role in ancient trade routes connecting Southeast Asia with South India and Sri Lanka.

Additional Information

• Geography of the Gulf of Mannar:

• The Gulf of Mannar extends from Tuticorin in Tamil Nadu, India to Mannar Island, Sri Lanka. It is approximately 160 kilometers wide.

• It is bordered by the Coromandel Coast in India and the Sri Lankan coastal plains. The waters are relatively shallow, making it ideal for coral growth and marine life.

• Marine Biodiversity:

• The Gulf of Mannar is renowned for its rich marine biodiversity, including coral reefs, pearl banks, seagrass ecosystems, and marine algae.

• It supports endangered species like the Dugong, green sea turtles, and whale sharks.

• The region is also a major contributor to India's marine fisheries industry, providing livelihoods to thousands of coastal communities.

• Adam's Bridge (Ram Setu):

• Adam's Bridge consists of a series of limestone shoals and sandbanks that historically connected India and Sri Lanka. It is believed to be submerged due to rising sea levels over time.

• According to Hindu mythology, this bridge was constructed by Lord Rama's army to rescue Goddess Sita from Ravana in Lanka.

• Modern geological studies suggest that it is a naturally formed structure, though it holds cultural and religious significance.

Important Points

• Historical Trade Significance:

• The Gulf of Mannar was historically a major trade route for spices, pearls, and other goods between Southeast Asia and the Indian subcontinent.

• Ancient Tamil literature mentions the Gulf of Mannar as a center for pearl diving. The region's pearl banks were famous for producing high-quality pearls.

• Ecological Concerns:

• The Gulf of Mannar faces threats from pollution, overfishing, and coral bleaching due to climate change.

• Conservation efforts like the establishment of the Gulf of Mannar Marine National Park aim to protect its unique biodiversity.

Q35. Answer: (c) Steel used in government-funded projects is completely manufactured in India

The correct answer is Steel used in government-funded projects is completely manufactured in India.

Key Points

• 'Melt and Pour' rule: This rule mandates that steel used for government-funded projects must be completely manufactured in India. It ensures that the steel is melted, poured, and processed entirely within the country.

• The rule aims to enhance the usage of domestically produced steel and supports the vision of Aatmanirbhar Bharat (self-reliant India), reducing dependency on imported steel. Hence, the statement is correct.

• This provision is part of the Domestically Manufactured Iron & Steel Products (DMI&SP) Policy 2025, which seeks to promote the domestic steel industry and ensure the quality of steel used in critical projects.

• The rule prevents practices such as importing partially processed steel and finishing it domestically to classify it as "domestic." Instead, it strictly requires complete domestic production. Hence, Option 1 is incorrect.

• Documentation of Indian melting processes for exports is not a requirement under the 'Melt and Pour' rule, making Option 2 incorrect.

• Biometric authentication at smelting plants is not a part of this rule, which makes Option 4 incorrect.

Additional Information

• Domestically Manufactured Iron & Steel Products (DMI&SP) Policy:

• The DMI&SP Policy was introduced by the Ministry of Steel, Government of India, to ensure the use of domestically produced steel in government-funded projects.

• This policy contributes to the growth of the Indian steel industry, which plays a critical role in infrastructure development, manufacturing, and economic growth.

• The policy aligns with the government's Make in India initiative, ensuring that domestic industries benefit from government procurement.

• Features of the 'Melt and Pour' Rule:

• It establishes strict guidelines for steel production processes, ensuring that the steel used in government projects is melted and poured in India.

• This prevents the misuse of classifications and guarantees the authenticity of domestically manufactured steel.

• The rule helps maintain quality standards and boosts the competitiveness of Indian steel manufacturers.

• Applications of the DMI&SP Policy:

• The policy is applicable to government-funded projects, including infrastructure projects such as highways, bridges, railways, and power plants.

• It promotes the use of domestic steel in sectors like construction, defense, and energy.

Important Points

• India’s Steel Industry:

• India is the second-largest steel producer in the world, with an annual production capacity exceeding 100 million tonnes.

• The industry contributes significantly to the country’s GDP and provides employment to millions.

• Government Initiatives:

• The government has launched initiatives like National Steel Policy 2017 to enhance production capacity and support sustainable practices.

• The DMI&SP Policy is a vital part of these efforts, ensuring the growth and competitiveness of the domestic steel industry.

Q36. Answer: (c) Guru Nanak Jayanti

The correct answer is Guru Nanak Jayanti.

Key Points

• Guru Nanak Jayanti, also known as Gurpurab, commemorates the birth anniversary of Guru Nanak Dev, the first Sikh Guru and the founder of Sikhism.

• Guru Nanak Jayanti is celebrated on the day of Kartik Purnima according to the Hindu lunar calendar, which usually falls in the month of November. In 2025, it is observed on 5th November.

• Guru Nanak Dev Ji was born in 1469 in Nankana Sahib, located in present-day Pakistan. His teachings emphasized unity, equality, selfless service, and devotion to God.

• The celebrations typically begin with Akhand Path, a continuous reading of the Guru Granth Sahib, the holy scripture of Sikhism, for 48 hours.

• A day before Guru Nanak Jayanti, a procession known as Nagar Kirtan is held, where devotees sing hymns and carry the Sikh flag, Nishan Sahib.

• On the day of the festival, Sikhs visit Gurdwaras and participate in prayers, kirtans, and community meals called Langar. The Langar reflects the values of equality and selfless service.

• The festival is not only celebrated by Sikhs but also revered by people of other communities who follow Guru Nanak Dev Ji's teachings of universal brotherhood and peace.

Additional Information

• Guru Nanak Dev Ji's Teachings:

• Equality: Guru Nanak Dev Ji rejected caste discrimination and emphasized that all humans are equal, irrespective of their religion, caste, or gender.

• Selfless Service: He encouraged people to engage in community service and help the needy without expecting anything in return.

• Three Pillars: Guru Nanak Dev Ji propagated three principles: Naam Japo (meditate on God’s name), Kirat Karo (earn an honest living), and Vand Chakko (share with others).

• Significance of Langar:

• The concept of Langar involves serving free meals to everyone, irrespective of their religion, caste, or social status. It is a symbol of community service and equality.

• Langar was initiated by Guru Nanak Dev Ji and has become an integral part of Sikhism.

• Celebrations Across the Globe:

• Guru Nanak Jayanti is celebrated worldwide by Sikhs and others who follow his teachings, especially in countries like India, Pakistan, Canada, the United States, and the United Kingdom.

• Special arrangements are made at Gurdwaras globally to mark this auspicious occasion.

Important Points

• Other Sikh Festivals:

• Baisakhi: Celebrated in April, marking the harvest season and the founding of the Khalsa Panth by Guru Gobind Singh Ji in 1699.

• Lohri: Celebrated in January, especially in Punjab, marking the harvest of winter crops and the beginning of the harvest season.

• Holi: Though primarily a Hindu festival celebrated in March, Sikhs also celebrate it as Hola Mohalla, a tradition established by Guru Gobind Singh Ji.

• Historical Significance:

• Guru Nanak Dev Ji’s teachings laid the foundation of Sikhism, which emphasizes the importance of spirituality, moral values, and social equality.

• His legacy continues to inspire millions worldwide, promoting peace, harmony, and universal brotherhood.

Q37. Answer: (b) Laapataa Ladies

The correct answer is Laapataa Ladies.

Key Points

• The International Indian Film Academy Awards (IIFA) is an annual event celebrating excellence in the Indian film industry, commonly known as Bollywood.

• The 25th edition of the IIFA Awards was hosted in the year 2025, marking a milestone for the prestigious awards.

• "Laapataa Ladies" won the coveted Best Picture award at the 25th IIFA Awards, showcasing its outstanding cinematic achievement and resonance with audiences and critics alike.

• The film garnered widespread acclaim for its unique storytelling, direction, and performances, making it a standout among its competitors.

• Other nominees in the Best Picture category included notable films like Article 370, Stree 2, and Bhool Bhulaiyaa 3, but "Laapataa Ladies" emerged victorious. Hence, "Laapataa Ladies" is the correct answer.

Additional Information

• About Laapataa Ladies:

• "Laapataa Ladies" is a critically acclaimed Indian movie that gained recognition for its engaging storyline and socially relevant themes.

• The movie is known for its unique perspective on women's issues and societal norms, blending humor and drama to address serious topics.

• Directed by a well-known filmmaker, the movie features a talented cast and brilliant performances that resonated with both audiences and critics.

• About IIFA Awards:

• The IIFA Awards celebrate excellence in Indian cinema and are one of the most prestigious awards ceremonies in the industry.

• The awards are held annually in different locations around the world, highlighting the global reach of Bollywood.

• The Best Picture category is one of the most anticipated awards of the event, recognizing the most outstanding film of the year.

• Other Nominees:

• Article 370: A political drama exploring the implications of the abrogation of Article 370 in Jammu and Kashmir.

• Stree 2: A sequel to the 2018 hit horror-comedy, continuing the narrative of a haunted village.

• Bhool Bhulaiyaa 3: A follow-up to the popular horror-comedy franchise, blending suspense and humor.

Important Points

• Significance of IIFA Awards:

• The awards not only celebrate the artistic and technical excellence of Bollywood but also serve as a platform to showcase its global appeal.

• Winning an IIFA Award is considered a huge honor and often leads to greater recognition for the films and artists involved.

• Key Achievements of "Laapataa Ladies":

• The film's victory at the IIFA Awards reflects its critical and commercial success.

• It addressed pressing social issues while entertaining audiences, setting a benchmark for future filmmakers.

Q38. Answer: (d) Pixxel

The correct answer is Pixxel.

Key Points

• Pixxel is an Indian space technology startup focused on building a constellation of advanced earth imaging satellites. The company's primary goal is to provide high-resolution hyperspectral data for various applications.

• Pixxel, in collaboration with Google, launched India's first private satellite constellation. This marked a significant milestone in India's private space sector.

• The collaboration with Google enabled Pixxel to leverage advanced analytics and cloud computing platforms to process the data collected by their satellites. This partnership highlights the importance of integrating technology and space science. Hence, Pixxel is the correct option.

• Pixxel's satellite constellation aims to provide critical insights into various sectors, such as agriculture, climate monitoring, and natural disaster management, by offering real-time data and analytics.

• This achievement aligns with the Indian government's efforts to promote private participation in space exploration, fostering innovation and global collaboration. Hence, Pixxel's contribution is significant for India's space industry.

Additional Information

• About Pixxel:

• Pixxel is a Bengaluru-based space tech startup founded in 2019. It aims to build a constellation of satellites for high-resolution imagery.

• Pixxel's focus is on hyperspectral imaging, which provides detailed data by capturing images in multiple wavelengths of the light spectrum.

• The company launched its first satellite, Anand, in April 2022 as part of its mission to deploy a network of satellites for real-time earth observation.

• Role of Google in the Partnership:

• Google partnered with Pixxel to provide cloud computing and AI-powered analytics solutions for processing satellite data.

• The collaboration allows Pixxel to utilize Google Cloud's AI and machine learning tools to analyze hyperspectral data effectively and deliver actionable insights to various industries.

• Applications of Pixxel's Satellite Constellation:

• Agriculture: Monitoring crop health, soil quality, and water resources to optimize farming practices.

• Environmental monitoring: Tracking deforestation, pollution, and climate change impact to ensure ecological sustainability.

• Disaster management: Providing real-time data to predict and mitigate the impact of natural disasters like floods, droughts, and wildfires.

Important Points

• Significance of Private Satellite Constellations:

• Private companies, such as Pixxel, are playing a crucial role in advancing space technology and making high-resolution satellite data accessible to industries and governments.

• The involvement of private players in space exploration aligns with the Indian government's space policy reforms, encouraging innovation and global competitiveness.

• Other Startups in Indian Space Tech:

• Skyroot Aerospace: Focused on developing cost-effective and reliable launch vehicles for small satellites.

• AgniKul Cosmos: Specializes in building customizable launch vehicles for low-earth orbit satellites.

• Bellatrix Aerospace: Working on developing in-space propulsion systems and orbital launch vehicles.

Q39. Answer: (b) 2024

The correct answer is 2024.

Key Points

• KIRTI stands for Khelo India Rising Talent Identification. It is an initiative launched by the Government of India to identify and nurture young sports talent across the country.

• The primary goal of KIRTI is to promote sports culture and provide a platform for young athletes to showcase their talent at the national and international level.

• The initiative was officially launched in the year 2024. Hence, the correct answer is 2024.

• KIRTI aims to bridge the gap in sports infrastructure and provide necessary resources like training, coaching, and facilities to aspiring athletes in India.

• This initiative is a part of the broader Khelo India Programme, which was launched by the Ministry of Youth Affairs and Sports to encourage sports participation and the overall development of sports in the country.

Additional Information

• Khelo India Programme:

• Launched in 2018, this programme is a flagship scheme of the Government of India to revive the sports culture in India at the grassroot level.

• Under this programme, talented players are identified in various sports disciplines and provided with financial assistance of Rs. 5 lakh annually for a period of 8 years.

• The programme has successfully organized events like the Khelo India Youth Games and Khelo India University Games, which have become a platform for young athletes to showcase their talent.

• Objectives of KIRTI:

• To identify young sports talent from schools, colleges, and various sports competitions across India and provide them with the required resources.

• To develop a strong network of sports infrastructure in both urban and rural areas to ensure accessibility for everyone.

• To create an ecosystem that encourages sports as a career option and elevates India’s performance on international platforms such as the Olympics.

• Key Features of KIRTI:

• Focuses on grassroots-level talent identification and development.

• Encourages collaboration between the government, private sector, and sports federations for better results.

• Offers access to world-class coaching facilities and training under expert coaches to enhance athletes' performance.

Important Points

• Role of Sports in Nation Building:

• Sports play a significant role in fostering a sense of unity, discipline, and national pride. Initiatives like KIRTI help in identifying young talent and empowering them to represent the country at the global level.

• Such programmes contribute to the physical and mental well-being of individuals and help address issues like obesity and lifestyle diseases through increased participation in physical activities.

• Major Sports Achievements of India:

• Olympics: India has seen a steady rise in its medal tally in recent Olympics, with notable performances in sports like weightlifting, wrestling, and badminton.

• Cricket: India has won the ICC Cricket World Cup twice (in 1983 and 2011), along with several other cricketing milestones.

• Paralympics: Indian athletes have excelled in the Paralympics, with remarkable performances in events like javelin throw, high jump, and badminton.

Q40. Answer: (a) New Delhi

The correct answer is New Delhi.

Key Points

• The 2025 Para Athletics World Championships will be hosted by New Delhi, India. This marks the first time India will host this prestigious international event.

• The announcement was made by the World Para Athletics (WPA), the global governing body for para-athletics, highlighting India’s growing focus on promoting sports for differently-abled athletes.

• India has previously hosted significant para-sporting events, including the Commonwealth Games and the Asian Para Games, which reflects its capability in organizing global tournaments. Hence, New Delhi is the correct location for hosting the event.

• New Delhi, the capital city of India, is well-equipped with world-class facilities, infrastructure, and accessibility standards required for hosting such a major international para-athletics event.

• The event is expected to attract athletes from all over the world, promoting in sports and showcasing India's organizational capabilities. Hence, New Delhi is a strategic choice for the venue.

• India’s hosting of the Para Athletics World Championships aligns with its commitment to empowering differently-abled individuals and fostering a culture of equality in sports. Para-sports have gained significant attention in India over the past decade. Hence, the announcement is a milestone in India’s sporting history.

Additional Information

• About World Para Athletics:

• World Para Athletics (WPA) is the governing body for para-athletics worldwide. It is a part of the International Paralympic Committee (IPC), which oversees various para-sporting events globally.

• WPA organizes several international events, including World Championships, which provide a platform for athletes with disabilities to showcase their talents and compete at the highest level.

• New Delhi as a Sporting Hub:

• New Delhi is known for hosting several international sporting events, such as the 2010 Commonwealth Games, showcasing its infrastructure and organizational capabilities.

• The city is equipped with facilities like the Jawaharlal Nehru Stadium and Indira Gandhi Indoor Stadium, which are among the largest and most advanced stadiums in India.

• The city is well-connected internationally and domestically, making it a convenient location for athletes and officials traveling from across the globe.

• Importance of Para Athletics World Championships:

• The Para Athletics World Championships serves as a platform for promoting inclusivity and accessibility in sports, encouraging the participation of differently-abled athletes.

• The event helps in breaking societal barriers and stereotypes associated with disability, fostering a spirit of equality and empowerment.

• It also highlights the importance of infrastructure development and policy-making to support para-athletes in their training and competitions.

Important Points

• India’s Achievements in Para Sports:

• India has shown remarkable progress in para-sports over the years, with athletes winning accolades in events such as the Paralympic Games, Asian Para Games, and various international championships.

• Prominent Indian para-athletes like Devendra Jhajharia (javelin throw) and Deepa Malik (shot put) have won medals in global events, inspiring many across the nation.

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• Government Initiatives for Para Sports:

• The Indian government has introduced several schemes to support para-athletes, including the Target Olympic Podium Scheme (TOPS) and Para Sports Development Fund.

• The Sports Authority of India (SAI) plays a crucial role in providing training facilities, coaching, and financial assistance to para-athletes.

• India's hosting of the 2025 Para Athletics World Championships is an important step in furthering its commitment to promoting para-sports on the global stage.

Q41. Answer: (b) 1980

Shortcut Trick

Convert time directly into hours to find the distance in km, then multiply by 1000 for meters.

Time = 1.2 min = 1.2 ÷ 60 hr = 1/50 hr.

Distance = Speed × Time = 99 × (1/50) = 1.98 km.

Length of bridge = 1.98 × 1000 = 1980 m.

Therefore The correct answer is 1980 m.

Alternate Method

Given:

Speed of the car = 99 km/hr

Time taken to cross the bridge = 1.2 minutes

Speed = 99 km/hr | Time = 1.2 min

Bridge

Length = D meters

Formula Used:

Distance = Speed × Time

Calculations:

=> First, convert the speed from km/hr to m/s.

=> Speed = 99 × (5 / 18) m/s

=> Speed = 55 / 2 m/s = 27.5 m/s

=> Now, convert the time from minutes to seconds.

=> Time = 1.2 minutes = 1.2 × 60 seconds = 72 seconds

=> Length of the bridge = Distance covered by the car

=> Distance = 27.5 m/s × 72 s

=> Distance = 1980 m

Therefore The correct answer is 1980 m.

Additional Information

Unit Conversion

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

Relative Speed

When two bodies move in the same direction, their relative speed is the difference of their speeds (S1 − S2). When they move in opposite directions, it is the sum of their speeds (S1 + S2).

Crossing Objects

When a vehicle (like a train) crosses a stationary object with significant length (bridge, platform), the total distance covered = length of vehicle + length of object. For a point object (man, pole), distance = length of vehicle.

Q42. Answer: (b) 12,350

Shortcut Trick

When interests earned are equal and the time period is the same, the ratio of investments is inversely proportional to their rates.

Ratio of investments = P1 : P2 = R2 : R1 = 13 : 9

Total parts = 13 + 9 = 22 parts → Rs. 20,900

1 part → 20,900 ÷ 22 = Rs. 950

Sum invested at 9% (P1) = 13 × 950 = Rs. 12,350

Therefore The correct answer is Rs. 12,350.

Alternate Method

Given:

Total investment = Rs. 20,900

Rate for Part 1 (R1) = 9% p.a., Rate for Part 2 (R2) = 13% p.a.

Time period (T) = 3 years for both parts

Formula Used:

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

Total Sum: Rs. 20,900

Part 1 (P1)

9% p.a. for 3 yrs

Part 2 (P2)

13% p.a. for 3 yrs

Interest 1 = Interest 2

Calculations:

=> Let the principal invested at 9% be P1 and at 13% be P2.

=> P1 + P2 = 20,900

=> According to the question, SI on Part 1 = SI on Part 2

=> (P1 × 9 × 3) ÷ 100 = (P2 × 13 × 3) ÷ 100

=> P1 × 27 = P2 × 39

=> P1 / P2 = 39 / 27 = 13 / 9

=> Let P1 = 13x and P2 = 9x.

=> 13x + 9x = 20,900

=> 22x = 20,900

=> x = 20,900 ÷ 22 = 950

=> Sum invested at 9% (P1) = 13 × 950 = 12,350

Therefore The correct answer is Rs. 12,350.

Additional Information

Equal Simple Interest Rule

When a sum is divided into multiple parts such that their Simple Interests are equal, the ratio of the principal amounts is P1 : P2 : P3 = 1 / (R1T1) : 1 / (R2T2) : 1 / (R3T3).

Equal Amounts Rule

If a sum is divided such that the final amounts (Principal + SI) after a certain time are equal, the investment ratio is P1 : P2 = 1 / (100 + R1T1) : 1 / (100 + R2T2).

Simple Interest vs Compound Interest

Simple Interest is always calculated consistently on the initial principal. In Compound Interest, the interest of the previous periods is accumulated with the principal to calculate the new interest.

Q43. Answer: (c) Rs. 520

Shortcut Trick

Since the time period is the same for all partners, the profit ratio equals their investment ratio.

Profit ratio = 1310 : 1430 : 1040 = 131 : 143 : 104

Total profit units = 131 + 143 + 104 = 378 units

Given 378 units = Rs. 1890 => 1 unit = Rs. 5

Yuvraj's share = 104 units = 104 × 5 = Rs. 520

Therefore The correct answer is Rs. 520.

Alternate Method

Given:

Rahul's investment = Rs. 1,310

Monika's investment = Rs. 1,430

Yuvraj's investment = Rs. 1,040

Total profit = Rs. 1,890

Formula Used:

Profit Share = (Individual Investment Ratio ÷ Total Investment Ratio) × Total Profit

Rs. 1310

Rahul

Rs. 1430

Monika

Rs. 1040

Yuvraj

Calculations:

=> Ratio of investments of Rahul, Monika and Yuvraj = 1310 : 1430 : 1040

=> Simplified Ratio = 131 : 143 : 104

=> Sum of the profit ratios = 131 + 143 + 104 = 378

=> Share of Yuvraj in the profit = (104 ÷ 378) × 1890

=> Share of Yuvraj = 104 × 5 = Rs. 520

Therefore The correct answer is Rs. 520.

Additional Information

Simple Partnership

When all partners invest their capital for the exact same duration, their profit or loss is distributed purely in the ratio of their invested amounts.

Compound Partnership

If partners invest capital for different periods, the profit sharing ratio is derived from the product of the capital and time (Profit Ratio = C1×T1 : C2×T2).

Working and Sleeping Partners

A working partner manages the firm and may receive a fixed salary out of the profits before distribution. A sleeping partner simply invests money and only gets a proportionate share of the remaining profit.

Q44. Answer: (d) 7056

Shortcut Trick

Side of the square = Perimeter ÷ 4

Side = 336 ÷ 4 = 84 m

Area of the square = side²

Area = 84 × 84 = 7056 m²

Therefore The correct answer is 7056 m².

Alternate Method

a = 84 m

a = 84 m

a = 84 m

a = 84 m

Area = 7056 sq. m

Perimeter = 336 m

Given:

Perimeter of the square = 336 m

Formula Used:

Perimeter of a square = 4 × side

Area of a square = side²

Calculation:

=> 4 × side = 336

=> side = 336 ÷ 4

=> side = 84 m

Now, calculate the area of the square:

=> Area = 84 × 84

=> Area = 7056 m²

Therefore The correct answer is 7056 m².

Additional Information

Relation between Area and Perimeter

The area of a square can be directly related to its perimeter (P) using the formula: Area = $P^2 \div 16$.

Diagonal of a Square

The length of the diagonal of a square with side 'a' is given by the formula: $d = a\sqrt{2}$.

Area using Diagonal

If the length of the diagonal 'd' is given, the area can be easily calculated as: Area = $d^2 \div 2$.

Properties of a Square

All four sides of a square are equal. The diagonals are equal in length and bisect each other exactly at 90°.

Q45. Answer: (a) 18

Shortcut Trick

The age difference between two people remains constant forever.

Let Son's age 3 years ago be x, then Father's age was 2x + 21, making the difference x + 21.

When Father becomes twice the Son's age, the Son's age must exactly equal this difference (x + 21).

Presently, Son's age is x + 3. Hence, years required from now = (x + 21) − (x + 3) = 18.

Therefore The correct answer is 18 years.

Alternate Method

3 Years Ago

Present

Future (+n yrs)

Son = x

Dad = 2x+21

Son = x+3

Dad = 2x+24

Son = S

Dad = 2S

+3

+n

Age Difference = (2x + 21) − x = x + 21 (Constant)

When Dad is 2 × Son, Son's Age = Difference = x + 21

Years from now (n) = (x + 21) − (x + 3) = 18

Given:

3 years ago, Father's age was 21 years more than twice the Son's age.

We need to find the number of years from now when the Father's age will be twice the Son's age.

Calculations:

Let the present age of the Father be F and the Son be S.

According to the condition 3 years ago:

=> (F − 3) = 2 × (S − 3) + 21

=> F − 3 = 2S − 6 + 21

=> F − 2S = 18 ... (Equation 1)

Let after 'n' years from now, the Father's age be twice the Son's age:

=> F + n = 2 × (S + n)

=> F + n = 2S + 2n

=> n = F − 2S

Substituting the value of (F − 2S) from Equation 1:

=> n = 18

Therefore The correct answer is 18 years.

Additional Information

Constant Age Difference

The difference between the ages of two individuals is always constant. If person A is older than person B by x years, A will always remain older by x years in the past or future.

Double Age Concept

When one person is exactly twice the age of another, the younger person's age is exactly equal to the age difference between them.

Q46. Answer: (a) 80%

Shortcut Trick

Let the base value of the goods be 100.

Claimed Selling Price = 100 + 57 = 157

Actual Cost Price (due to using 13% less weight) = 100 − 13 = 87

Profit = Claimed SP − Actual CP = 157 − 87 = 70

Total Profit % = (70 ÷ 87) × 100 ≈ 80.46% ≈ 80%

Therefore The correct answer is 80%.

Alternate Method

Given:

Claimed profit percentage = 57%

Dishonest weight used = 13% less than the marked weight

Formula Used:

Profit % = [(Selling Price − Cost Price) ÷ Cost Price] × 100

Dishonest Dealer Profit Calculation

Actual CP: 87

Profit: 70

Selling Price: 157

Total Profit % = (70 ÷ 87) × 100 ≈ 80%

Calculations:

=> Let the cost price of 1000 g of vegetables be Rs. 1000.

=> The trader claims a profit of 57%, so Selling Price (SP) for 1000 g = 1000 + (57% of 1000) = Rs. 1570.

=> However, the trader uses a weight 13% less than 1000 g.

=> Actual weight given to the customer = 1000 − (13% of 1000) = 1000 − 130 = 870 g.

=> The actual Cost Price (CP) incurred by the trader is for the given 870 g = Rs. 870.

=> Profit earned by the trader = SP − CP = 1570 − 870 = Rs. 700.

=> Total Profit % = (700 ÷ 870) × 100

=> Total Profit % = (70 ÷ 87) × 100 = 7000 ÷ 87 ≈ 80.459%

=> Rounding off to the nearest whole number gives 80%.

Therefore The correct answer is 80%.

Additional Information

Dishonest Dealer Formula

When a dealer claims to sell at Cost Price but uses false weight, the true profit percentage is given by: [Error ÷ (True Weight − Error)] × 100.

Combined Effect in Dishonest Dealing

When a trader manipulates both the selling price (mark up) and the weight, calculate the effective Cost Price for the actual quantity given and compare it with the charged Selling Price to find the total profit.

Successive Percentage Change

Alternatively, the net effect of two successive changes of x% and y% can be calculated using the formula: Net % = x + y + (x × y) ÷ 100.

Q47. Answer: (a) 43

Shortcut Trick

The unit digit of the number 861616843 is 3, which is an odd number.

Thus, it cannot be perfectly divided by an even number (36) or a number ending in zero (50).

We test the first remaining option, 43, by splitting the number: 861616843 = 860000000 + 1616843.

860000000 ÷ 43 = 20000000 (divides exactly).

1616843 ÷ 43 = 37601 (divides exactly).

Therefore The correct answer is 43.

Alternate Method

Given:

Number = 861616843

Options = 43, 47, 50, 36

Calculation:

=> The given number 861616843 ends with an odd digit (3).

=> Any number ending with an odd digit cannot be completely divided by an even number or a multiple of 10.

=> Therefore, we can immediately eliminate Option 3 (50) and Option 4 (36).

=> Let us check divisibility by 43 using standard division.

=> First, take the starting digits: 86 ÷ 43 = 2 with a remainder of 0.

=> Bring down 161: 161 ÷ 43 = 3 with a remainder of 32.

=> Bring down 6 to make 326: 326 ÷ 43 = 7 with a remainder of 25.

=> Bring down 8 to make 258: 258 ÷ 43 = 6 with a remainder of 0.

=> Bring down 4, which is not divisible by 43, so we add a 0 to the quotient.

=> Bring down 3 to make 43: 43 ÷ 43 = 1 with a remainder of 0.

=> Combining the quotients gives us exactly 20037601 without any remainder.

=> Since the remainder is completely zero, the given number is fully divisible by 43.

Therefore The correct answer is 43.

Additional Information

Divisibility Rule of 2, 4, and 8

A number is divisible by 2 if its last digit is even; by 4 if its last two digits form a number divisible by 4; and by 8 if its last three digits form a number divisible by 8.

Divisibility Rule of 3 and 9

A number is divisible by 3 if the sum of its digits is divisible by 3. It is divisible by 9 if the sum of its digits is divisible by 9.

Divisibility Rule of 5 and 10

A number is exactly divisible by 5 if its last digit is either 0 or 5. It is divisible by 10 only if its last digit is 0.

Odd and Even Constraints in Division

An odd number cannot be divided perfectly by any even number. Recognizing this rule allows you to quickly eliminate options in exams without performing extensive calculations.

Q48. Answer: (b) M - N = 2

Shortcut Trick

For a number to be divisible by 11, the difference between the sums of alternating digits must be 0 or a multiple of 11.

Alternating sums for the digits of N18M05 are (N + 8 + 0) and (1 + M + 5).

=> N + 8 = 1 + M + 5

=> N + 8 = M + 6

=> M − N = 2

Therefore The correct answer is M − N = 2.

Alternate Method

Given:

The 6-digit number is N18M05.

The number is perfectly divisible by 11.

Concept Used:

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

Calculation:

=> Sum of digits at odd places (from right) = 5 + M + 1 = M + 6

=> Sum of digits at even places (from right) = 0 + 8 + N = N + 8

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

=> Difference = (N + 8) − (M + 6)

=> Difference = N − M + 2

For the number to be divisible by 11, we equate the difference to 0 (since equating it to 11 or −11 does not yield relations matching the given options for single-digit numbers).

=> N − M + 2 = 0

=> M − N = 2

Therefore The correct answer is M − N = 2.

Additional Information

Divisibility Rule of 3 and 9

A number is perfectly divisible by 3 or 9 if the sum of all its digits is divisible by 3 or 9 respectively.

Divisibility Rule of 4

A number is perfectly divisible by 4 if the number formed by its last two digits is divisible by 4.

Divisibility Rule of 8

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

Q49. Answer: (d) 50 : 60

Shortcut Trick

Compare the fractions to a base value like 1/2 to quickly eliminate the smaller ratios.

37/76 and 35/72 are both less than 1/2 (as 37 × 2 < 76 and 35 × 2 < 72).

43/65 and 50/60 are greater than 1/2. Compare them directly via cross-multiplication.

43/65 vs 5/6 => 43 × 6 = 258 and 65 × 5 = 325.

Since 325 > 258, the ratio 50 : 60 is strictly the greatest among them all.

Therefore The correct answer is 50 : 60.

Alternate Method

Given:

Four ratios: 37 : 76, 43 : 65, 35 : 72, and 50 : 60

Method Used:

Convert each ratio into a decimal or percentage value to easily compare their true magnitudes.

37:76

~48.7%

43:65

~66.2%

35:72

~48.6%

50:60

83.3% (Greatest)

0%

50%

100%

Calculations:

=> 37 ÷ 76 ≈ 0.4868 or 48.68%

=> 43 ÷ 65 ≈ 0.6615 or 66.15%

=> 35 ÷ 72 ≈ 0.4861 or 48.61%

=> 50 ÷ 60 = 5 ÷ 6 ≈ 0.8333 or 83.33%

=> Comparing the evaluated fractions, 83.33% is clearly the highest decimal equivalent.

Therefore The correct answer is 50 : 60.

Additional Information

Compound Ratio

For two or more given ratios such as a:b and c:d, their compound ratio is formed by multiplying their respective antecedents and consequents to get ac:bd.

Duplicate & Sub-duplicate Ratio

The duplicate ratio of a:b is calculated as a2:b2, while its sub-duplicate ratio is evaluated as √a:√b.

Proportion Rule

When two respective ratios are exactly equal (a/b = c/d), they form a valid proportion where the product of the extremes directly equals the product of the means (ad = bc).

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Q50. Answer: (c) A square is a special case of both a rectangle and a rhombus

Shortcut Trick

A rectangle requires all its internal angles to be exactly 90°.

A rhombus requires all its four sides to be equal in length.

A square is a shape that has all 90° angles AND all equal sides.

Since it meets all the defining conditions of both shapes, it inherently belongs to both families.

Therefore The correct answer is both a rectangle and a rhombus.

Alternate Method

Given:

Statements comparing a square to a rectangle and a rhombus.

Properties Used:

Definitions of Quadrilaterals (Rectangle, Rhombus, and Square)

Rectangle

Rhombus

Square

• =

Angles = 90°

All sides equal

Sides equal &

Angles = 90°

Calculations:

=> By definition, a rectangle is a quadrilateral where all internal angles measure exactly 90°.

=> A rhombus is defined as a quadrilateral where all four sides are of equal length.

=> A square is constructed as a quadrilateral where all four sides are equal AND all four internal angles measure exactly 90°.

=> Since a square exhibits opposite sides being equal and all angles as 90°, it completely satisfies the properties of a rectangle.

=> Since a square has all four sides equal, it also satisfies the core geometric property of a rhombus.

=> Thus, a square inherently functions as a special specialized subset of both figures simultaneously.

Therefore The correct answer is both a rectangle and a rhombus.

Additional Information

Parallelogram Hierarchy

A parallelogram is a quadrilateral with opposite sides parallel and equal. Rectangles, rhombuses, and squares are all categorized as special types of parallelograms.

Trapezium

A trapezium (or trapezoid) is a quadrilateral that possesses exactly one pair of opposite parallel sides, setting it apart from the dual-parallel structure of parallelograms.

Diagonals Property

The diagonals of a rectangle are always equal in length. The diagonals of a rhombus always bisect each other at precisely 90°. A square inherits both rules simultaneously.

Q51. Answer: (d) 800

Shortcut Trick

Using the Alligation Method on Profit/Loss percentages:

Ratio of Cost Prices = (Gain% − Net%) : (Net% − Loss%) = (18 − 0) : (0 − (−9)) = 18 : 9 = 2 : 1

Total parts for both dresses = 2 + 1 = 3 parts.

3 parts = Rs. 1,200 => 1 part = Rs. 400.

Cost price of first dress (2 parts) = 2 × 400 = Rs. 800.

Therefore The correct answer is Rs. 800.

Alternate Method

Given:

Total Cost Price of two dresses = Rs. 1,200

Loss on 1st dress = 9%

Gain on 2nd dress = 18%

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Overall gain or loss = 0%

Formula Used:

Loss = CP × (Loss% ÷ 100)

Gain = CP × (Gain% ÷ 100)

Dress 1 Loss

−9%

Dress 2 Gain

+18%

0%

Net

18

9

CP Ratio = 18 : 9 = 2 : 1

Dress 1 = (2 ÷ 3) × 1200 = Rs. 800

Calculations:

Let the cost price of the first dress be C1 and the second dress be C2.

=> C1 + C2 = 1200

Since there is neither profit nor loss on the whole transaction:

=> Total Loss on 1st dress = Total Gain on 2nd dress

=> 9% of C1 = 18% of C2

=> 9 × C1 = 18 × C2

=> C1 ÷ C2 = 18 ÷ 9 = 2 ÷ 1

The cost prices are in the ratio 2 : 1.

=> Total ratio parts = 2 + 1 = 3 parts

=> 3 parts = Rs. 1,200

=> 1 part = 1200 ÷ 3 = Rs. 400

=> Cost price of the first dress (C1) = 2 parts = 2 × 400 = Rs. 800

Therefore The correct answer is Rs. 800.

Additional Information

No Profit No Loss Principle

When a transaction results in neither profit nor loss, the absolute value of the profit made on one item is exactly equal to the absolute value of the loss incurred on the other item. Thus, Profit on Item A = Loss on Item B.

Alligation Method in Profit and Loss

Alligation can be efficiently used to find the ratio of cost prices when two items are sold at different profit/loss percentages and the overall profit/loss percentage is given. The resultant cross-difference ratio strictly represents the ratio of their Cost Prices (CP).

Selling Price Formula

Selling Price (SP) = CP × (100 ± Profit/Loss%) ÷ 100. In a "no profit no loss" case, the sum of the SP of all items equals the sum of the CP of all items.

Q52. Answer: (d) Rs. 75,150

Shortcut Trick

Effective SI% for Case 1 = 4.2 × 10/3 = 14%

Effective SI% for Case 2 = 6.4 × 12.5 = 80%

Required Amount% = Principal (100%) + SI (80%) = 180%

Since 14% of Principal = Rs. 5,845

180% of Principal = (5845 ÷ 14) × 180 = 417.5 × 180 = Rs. 75,150

Therefore The correct answer is Rs. 75,150.

Alternate Method

Given:

SI1 = Rs. 5,845

R1 = 4.2%, T1 = 3 1/3 = 10/3 years

R2 = 6.4%, T2 = 12.5 years

Formula Used:

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

Amount = P + SI

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Case 1

R = 4.2%, T = 10/3 yrs

SI = Rs. 5,845

14% of P = 5845

P = Rs. 41,750

Case 2

R = 6.4%, T = 12.5 yrs

SI = 80% of P

Amount = 180% of P

Total Amount = Rs. 75,150

Calculations:

=> 5845 = (P × 4.2 × 10/3) ÷ 100

=> 5845 = (P × 14) ÷ 100

=> P = (5845 × 100) ÷ 14

=> P = 417.5 × 100 = Rs. 41,750

Now, finding SI for Case 2:

=> SI2 = (41750 × 6.4 × 12.5) ÷ 100

=> SI2 = (41750 × 80) ÷ 100 = Rs. 33,400

=> Amount = P + SI2 = 41750 + 33400 = Rs. 75,150

Therefore The correct answer is Rs. 75,150.

Additional Information

0;font-weight:700;color:#222222;>Effective Interest Rate in SI

In simple interest, the total interest percentage over a given period is the product of Rate (R) and Time (T). Total SI = (R × T)% of Principal.

0;font-weight:700;color:#222222;>Amount Formula

The total amount payable is the sum of the initial principal and the interest earned. Amount = P[1 + (RT ÷ 100)].

0;font-weight:700;color:#222222;>Simple Interest vs Compound Interest

While SI is strictly calculated on the original principal each year, Compound Interest (CI) is calculated on the accumulated amount (Principal + previous Interest). Formula: $A = P(1 + R/100)^n$.

Q53. Answer: (a) 33.25

Shortcut Trick

65% of 65 = 65 × 65 ÷ 100 = 4225 ÷ 100 = 42.25

1/5 of 45 = 9

Difference = 42.25 − 9 = 33.25

Therefore The correct answer is 33.25.

Alternate Method

Given:

First value = 65% of 65

Second value = 1/5 of 45

Calculations:

=> First value = (65 ÷ 100) × 65 = 4225 ÷ 100

=> First value = 42.25

=> Second value = (1 ÷ 5) × 45

=> Second value = 9

=> Required difference = First value − Second value

=> Required difference = 42.25 − 9 = 33.25

Therefore The correct answer is 33.25.

Additional Information

BODMAS Rule

Always solve bracket first, followed by 'of', division, multiplication, addition, and subtraction in that exact order to simplify any mathematical expression.

Squares Ending in 5

The square of a number ending in 5 (e.g., 65) can be found quickly: multiply the first digit by the next integer (6 × 7 = 42) and simply append 25 to get 4225.

Percentage and Fractions

To convert a percentage into a fraction or decimal, simply divide the number by 100. In mathematics, the word 'of' indicates multiplication between the given values.

Q54. Answer: (a) 153

Shortcut Trick

Solve brackets from innermost to outermost directly using BODMAS.

=> (5 − 9) = −4

=> { 11 + 2 × (−4) } = 11 − 8 = 3

=> 459 ÷ 3 = 153

Therefore The correct answer is 153.

Alternate Method

Given:

[459 ÷ {11 + 2 × (5 − 9)}]

Formula Used:

BODMAS Rule (Brackets, Orders, Division, Multiplication, Addition, Subtraction)

Calculations:

=> 459 ÷ {11 + 2 × (5 − 9)}

=> 459 ÷ {11 + 2 × (−4)}

=> 459 ÷ {11 − 8}

=> 459 ÷ 3

=> 153

Therefore The correct answer is 153.

Additional Information

BODMAS Rule

BODMAS stands for Brackets, Orders, Division, Multiplication, Addition, and Subtraction. It determines the sequence of operations in a mathematical expression.

Order of Brackets

When solving expressions, evaluate brackets from innermost to outermost: Round brackets () first, then Curly brackets { }, and finally Square brackets [].

Divisibility Rule of 3

A number is divisible by 3 if the sum of its digits is a multiple of 3. For 459, the sum is 4 + 5 + 9 = 18, which is divisible by 3, making division easier.

Q55. Answer: (b) (√(x²+y²))/(y)

Shortcut Trick

Using the fundamental trigonometric identity:

=> $\text{cosec}^2\,\theta = 1 + \cot^2\,\theta$

=> $\text{cosec}\,\theta = \sqrt{(1 + (x/y)^2)} = \sqrt{((y^2 + x^2) / y^2)}$

=> $\text{cosec}\,\theta = (\sqrt{(x^2 + y^2)}) / y$

Therefore The correct answer is $(\sqrt{(x^2+y^2)})/(y)$.

Alternate Method

θ

Base = x

Perpendicular = y

Hypotenuse = $\sqrt{(x^2 + y^2)}$

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Given:

=> cot θ = x / y

Formula Used:

=> cot θ = Base / Perpendicular

=> cosec θ = Hypotenuse / Perpendicular

Calculations:

=> Let Base = x and Perpendicular = y.

=> According to Pythagoras theorem:

=> Hypotenuse² = Base² + Perpendicular²

=> Hypotenuse = √(x² + y²)

=> Substituting the computed values into the formula for cosec θ:

=> cosec θ = Hypotenuse / Perpendicular

=> cosec θ = (√(x² + y²)) / y

Therefore The correct answer is (√(x²+y²))/(y).

Additional Information

Trigonometric Ratios

In a right-angled triangle, sin θ = Perpendicular / Hypotenuse, cos θ = Base / Hypotenuse, and tan θ = Perpendicular / Base. Their corresponding reciprocals are cosec θ, sec θ, and cot θ.

Pythagoras Theorem

It states that in any right-angled triangle, the square of the hypotenuse is exactly equal to the sum of the squares of the perpendicular and the base: Hypotenuse² = Perpendicular² + Base².

Fundamental Trigonometric Identities

The three core identities universally used in trigonometry are: sin² θ + cos² θ = 1, sec² θ − tan² θ = 1, and cosec² θ − cot² θ = 1.

Q56. Answer: (c) 48 hours

Shortcut Trick

Time to fill full tank: P = 27 × 4/3 = 36 hours, Q = 12 × 3/2 = 18 hours.

In 6 hours, part filled by P and Q = 6 × (1/36 + 1/18) = 1/2 tank.

Pipe R empties this 1/2 tank in 8 hours => Full tank empty time for R = 16 hours.

Let total capacity = LCM(36, 18, 16) = 144 units.

Net efficiency of (P + Q − R) = (144 ÷ 36) + (144 ÷ 18) − (144 ÷ 16) = 4 + 8 − 9 = 3 units/hour.

Therefore The correct answer is 48 hours.

Alternate Method

Given:

Time taken by P to fill 3/4 part of the tank = 27 hours.

=> Total time taken by P to fill the empty tank = 27 × 4/3 = 36 hours.

Time taken by Q to fill 2/3 part of the tank = 12 hours.

=> Total time taken by Q to fill the empty tank = 12 × 3/2 = 18 hours.

Part filled by P and Q in 6 hours = 6 × (1/36 + 1/18) = 6 × (3/36) = 1/2.

Pipe R empties this 1/2 tank in 8 hours.

=> Total time taken by R alone to empty the full tank = 8 × 2 = 16 hours.

Pipe	Time (Hours)	Total Work	Efficiency
P	36	144	+4
Q	18	+8	
R	16	−9	

Calculations:

=> Net efficiency of P, Q, and R together = 4 + 8 − 9 = 3 units/hour.

=> Time taken by P, Q, and R to fill the tank = Total Work ÷ Net Efficiency

=> Time taken = 144 ÷ 3 = 48 hours.

Therefore The correct answer is 48 hours.

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Additional Information

Inlet and Outlet Pipes

If a pipe fills a tank in x hours, its efficiency is taken as positive (1/x). If an outlet pipe empties the tank in y hours, its efficiency is taken as negative (−1/y).

LCM Method for Time & Work

Total work is assumed as the LCM of all the given individual times. Efficiency is calculated as Total Work ÷ Time taken. The total time for combined work = Total Work ÷ Net Efficiency.

Part of Tank Filled or Emptied

The fraction of the tank filled or emptied in a given time period is equal to the Time taken × Rate of work (Combined Efficiency).

Q57. Answer: (c) 48 cm2

Shortcut Trick

The area of a triangle can be directly calculated by multiplying the base and height and dividing by 2.

Area = (Base × Height) ÷ 2

Area = (12 × 8) ÷ 2 = 96 ÷ 2 = 48 cm².

Therefore The correct answer is 48 cm².

Alternate Method

Given:

=> Base of the triangle (b) = 12 cm

=> Height of the triangle (h) = 8 cm

Base = 12 cm

Height = 8 cm

Formula Used:

=> Area of a Triangle = (1 ÷ 2) × Base × Height

Calculations:

=> Area = (1 ÷ 2) × 12 × 8

=> Area = 6 × 8

=> Area = 48

Therefore The correct answer is 48 cm².

Additional Information

Heron's Formula

When the lengths of all three sides (a, b, c) are known, Area = √[s × (s−a) × (s−b) × (s−c)], where s is the semi-perimeter: s = (a + b + c) ÷ 2.

Area of an Equilateral Triangle

If all sides of a triangle are equal (side = a), the formula for the area is directly given as (√3 ÷ 4) × a².

Area of a Right-Angled Triangle

For a right-angled triangle, the area is simply (1 ÷ 2) × Perpendicular × Base, since the perpendicular side acts as the height.

Q58. Answer: (a) 20

Shortcut Trick

SP = 50000 − 18000 = 32000

Ratio of SP to MP = 32000 / 50000 = 16 / 25

For 2 successive discounts, multiplying factor = √(SP / MP) = √(16 / 25) = 4 / 5

Discount % (x) = (1 − 4/5) × 100% = 20%

Therefore The correct answer is 20%.

Alternate Method

Given:

Marked Price (MP) = Rs. 50,000

Total Discount = Rs. 18,000

Formula Used:

SP = MP × (1 − x/100)²

MP = Rs. 50,000

SP = Rs. 32,000

2 discounts of x%
Discount = Rs. 18,000
Calculation:
=> Selling Price (SP) = MP − Total Discount
=> SP = 50000 − 18000 = 32000
=> SP = MP × (1 − x/100)²
=> 32000 = 50000 × (1 − x/100)²
=> (1 − x/100)² = 32000 / 50000
=> (1 − x/100)² = 16 / 25
=> 1 − x/100 = √(16 / 25)
=> 1 − x/100 = 4 / 5
=> x/100 = 1 − 4/5 = 1/5
=> x = 100 / 5 = 20
Therefore The correct answer is 20%.
Additional Information
Successive Discount
For two successive discounts of a% and b%, the effective single discount is given by (a + b − ab/100)%.
Relation between MP and SP
Selling Price (SP) = Marked Price (MP) × (100 − Discount%) ÷ 100. The discount is always calculated on the Marked Price.
Multiplier Concept
If an article is given n successive equal discounts of x%, then SP = MP × (1 − x/100)ⁿ.

Q59. Answer: (c) 161

Shortcut Trick
The average of the first 'n' even natural numbers is directly given by the formula (n + 1).
Here, the total number of terms, n = 160.
Average = 160 + 1 = 161.
Therefore The correct answer is 161.
Alternate Method
Given:
Sequence of the first 160 even numbers: 2, 4, 6, ..., up to 160 terms.
Formula Used:
Average of an Arithmetic Progression (AP) = (First term + Last term) ÷ 2
2
161
320
First Term
(1st even)
Last Term
(160th even)
Average = (2 + 320) ÷ 2
...
...
Average of an AP is its midpoint
Calculations:
=> First even number (First term) = 2 × 1 = 2
=> 160th even number (Last term) = 2 × 160 = 320
=> Average = (2 + 320) ÷ 2
=> Average = 322 ÷ 2
=> Average = 161
Therefore The correct answer is 161.
Additional Information

Average of first 'n' Natural Numbers

The average of the first 'n' natural numbers is given by the formula (n + 1) ÷ 2.

Average of first 'n' Odd Numbers

The average of the first 'n' consecutive odd numbers is simply equal to n.

Average of squares of first 'n' Natural Numbers

The average of the squares of the first 'n' natural numbers is calculated as (n + 1)(2n + 1) ÷ 6.

Average of an Arithmetic Progression

For any sequence in an arithmetic progression, the average is always equal to the midpoint of the series, i.e., (First term + Last term) ÷ 2.

Q60. Answer: (a) 6 6/167 hours

Shortcut Trick

Total Capacity of tank = LCM(18, 21, 16) = 1008 units.

Combined Efficiency = (1008 ÷ 18) + (1008 ÷ 21) + (1008 ÷ 16) = 56 + 48 + 63 = 167 units/hr.

Time to fill together = Total Capacity ÷ Combined Efficiency = 1008 ÷ 167 = 6 ^6/167 hours.

Therefore The correct answer is 6 ^6/167 hours.

Alternate Method

Given:

Time taken by Pipe A = 18 hours

Time taken by Pipe B = 21 hours

Time taken by Pipe C = 16 hours

Formula Used:

Total Work = LCM of given time periods

Efficiency = Total Work ÷ Time Taken

Time Taken Together = Total Work ÷ Combined Efficiency

Pipe	Hours	Total Work	Efficiency
Pipe A	18	1008	56
Pipe B	21	48	
Pipe C	16	63	

Calculations:

=> Total combined efficiency = 56 + 48 + 63 = 167 units/hr

=> Time taken to fill the tank together = Total Work ÷ Total Efficiency

=> Time taken = 1008 ÷ 167 = 6 ^6/167 hours

Therefore The correct answer is 6 ^6/167 hours.

Additional Information

Pipes & Cisterns Concept

If a pipe can fill a tank in x hours, the part of the tank filled in 1 hour is 1/x. This unit-work approach is equivalent to finding fractional efficiency.

Inlet vs Outlet Pipes

Inlet pipes add water to the tank, so their efficiency is taken as positive. Outlet (leak) pipes remove water, so their efficiency is taken as negative when computing combined net work.

Efficiency & Time Relationship

Efficiency is inversely proportional to time taken (Efficiency = Work ÷ Time). A pipe that takes fewer hours to fill a tank has a higher individual filling capacity.

Q61. Answer: (a) 7

Shortcut Trick

The last digit of the number 814242541 is 1 (an odd number).

Numbers ending in an odd digit cannot be divided by even numbers, so 8 and 12 are eliminated.

Numbers divisible by 15 must end in 0 or 5, so 15 is also eliminated.

By the method of elimination, the given number must be divisible by 7.

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Therefore The correct answer is 7.

Alternate Method

Given:

Number = 814242541

Calculations:

Let us check the divisibility rule for 7 directly.

Rule for 7: Form groups of 3 digits starting from the rightmost digit. The difference between the sum of odd-positioned groups and even-positioned groups must be divisible by 7.

=> Groups of three digits from right to left: 541, 424, 814

=> Sum of odd-positioned groups = 541 + 814 = 1355

=> Sum of even-positioned groups = 424

=> Difference = 1355 − 424 = 931

=> Checking divisibility of 931 by 7: 931 ÷ 7 = 133

=> Since 931 is exactly divisible by 7, the entire number 814242541 is also divisible by 7.

Therefore The correct answer is 7.

Additional Information

Divisibility Rule of 7, 11, and 13

Form groups of 3 digits from right to left. Find the difference between the sum of odd-placed groups and even-placed groups. If the difference is divisible by 7, 11, or 13, then the original number is divisible by 7, 11, or 13 respectively.

Divisibility Rule of 8

A number is divisible by 8 if the number formed by its last three digits is a multiple of 8.

Divisibility Rule of 12

A number is divisible by 12 if it is divisible by both 3 and 4.

Divisibility Rule of 15

A number is divisible by 15 if it is divisible by both 3 and 5. This means it must end in 0 or 5 and the sum of its digits must be a multiple of 3.

Q62. Answer: (b) 1 km/hr

Shortcut Trick

Speed ratio of Anmol = 1 : 2

Time ratio of Anmol = 2 : 1 (Difference = 1 unit)

Total time saved by doubling speed = 7 hrs (late) + 8 hrs (early) = 15 hrs

1 unit = 15 hrs => Original time (2 units) = 30 hrs

Anmol's speed = Distance ÷ Time = 30 ÷ 30 = 1 km/hr

Therefore The correct answer is 1 km/hr.

Alternate Method

Given:

Total Distance = 30 km

Anmol takes 7 hours more than Nikhil initially.

If Anmol doubles his speed, he takes 8 hours less than Nikhil.

Distance = 30 kmNormal speed time → t + 7 hrsDouble speed time → t − 8 hrsAnmol's total time difference = 15 hrs

Formula Used:

Speed = Distance ÷ Time

Calculations:

Let the original time taken by Anmol be t_a and by Nikhil be t_n.

=> t_a − t_n = 7 ... (i)

When Anmol's speed is doubled, his new time becomes t_a ÷ 2.

=> t_n − (t_a ÷ 2) = 8 ... (ii)

Adding equations (i) and (ii):

=> t_a − (t_a ÷ 2) = 7 + 8

=> t_a ÷ 2 = 15

=> t_a = 30 hours

Anmol's original speed = Distance ÷ Time

=> Speed = 30 ÷ 30 = 1 km/hr

Therefore The correct answer is 1 km/hr.

Additional Information

Speed and Time Inverse Relation

When the distance is constant, speed is inversely proportional to time. If speed becomes n times, the required time becomes 1/n times.

Average Speed

Average speed is the ratio of total distance traveled to total time taken. For two equal distances covered at speeds x and y, Average Speed = (2 × x × y) ÷ (x + y).

Relative Speed

When two objects move in the same direction, relative speed is the difference of their speeds. In opposite directions, it is the sum of their speeds.

Q63. Answer: (a) 20,995

Shortcut Trick

Net Population = Initial Base × Successive Multiplying Factors

Final Population = 12500 × (100 + 52)% × (100 + 30)% × (100 − 15)%

Final Population = 12500 × 1.52 × 1.30 × 0.85

Final Population = 19000 × 1.30 × 0.85 = 24700 × 0.85 = 20995

Therefore The correct answer is 20,995.

Alternate Method

Given:

Initial Population (P) = 12,500

Successive changes over three years: +52%, +30%, and −15%

Formula Used:

Final Value = P × (1 ± R1/100) × (1 ± R2/100) × (1 ± R3/100)

Initial

End of Yr 1

End of Yr 2

End of Yr 3

12,500

19,000

24,700

20,995

+52%

+30%

−15%

Calculations:

=> Population at the end of Year 1 = 12500 × (1 + 52/100)

=> Population at the end of Year 1 = 12500 × 152/100 = 19000

=> Population at the end of Year 2 = 19000 × (1 + 30/100)

=> Population at the end of Year 2 = 19000 × 130/100 = 24700

=> Population at the end of Year 3 = 24700 × (1 − 15/100)

=> Population at the end of Year 3 = 24700 × 85/100 = 20995

Therefore The correct answer is 20,995.

Additional Information

Successive Percentage Change

When a value is changed successively by a% and b%, the net percentage change is given by the formula: Net Change = (a + b + a×b ÷ 100)%.

Final Value Formula

For successive changes over multiple periods, the final value is calculated as: Final Value = Initial Value × (1 ± r1/100) × (1 ± r2/100) × ...

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Population Depreciation

If a population or machine value decreases by a constant rate of r% every year, the value after n years is calculated using $P(1 - r/100)^n$.

Q64. Answer: (b) 27

Shortcut Trick

The product of two consecutive numbers x and (x + 1) is approximately equal to x^2.

We know the squares of nearby numbers: $26^2 = 676$ and $27^2 = 729$.

The given product 702 lies perfectly between 676 and 729, meaning the numbers are 26 and 27.

Checking the product directly: 26 × 27 = 702.

Hence, the greater of the two numbers is 27.

Therefore The correct answer is 27.

Alternate Method

Given:

The product of two consecutive natural numbers = 702

Calculation:

Let the smaller natural number be n.

Then, the greater consecutive natural number will be (n + 1).

=> $n \times (n + 1) = 702$

=> $n^2 + n = 702$

=> $n^2 + n - 702 = 0$

=> $n^2 + 27n - 26n - 702 = 0$

=> $n(n + 27) - 26(n + 27) = 0$

=> $(n - 26)(n + 27) = 0$

=> n = 26 or n = −27

Since n must be a natural number, it cannot be a negative value.

=> n = 26

The greater number = n + 1

=> 26 + 1 = 27

Therefore The correct answer is 27.

Additional Information

Consecutive Numbers

Numbers that follow each other continuously in order from smallest to largest, with a common difference of 1. They are generally represented as n, n+1, n+2, etc.

Consecutive Even or Odd Numbers

These numbers skip one integer, meaning they always maintain a difference of 2. They are represented as 2n, 2n+2 for even numbers, and 2n+1, 2n+3 for odd numbers.

Quadratic Equation Roots

For a quadratic equation in the form $ax^2 + bx + c = 0$, the sum of roots is given by (−b ÷ a) and the product of roots is given by (c ÷ a).

Q65. Answer: (d) 12.8

Shortcut Trick

Make the number of decimal places equal: 12.800 and 0.004.

Treat the numbers as integers: 12800 and 4.

Find the LCM of the integers: LCM of 12800 and 4 is 12800.

Place the decimal point back 3 places from the right: 12.800

Therefore The correct answer is 12.8.

Alternate Method

Given:

Numbers: 12.8 and 0.004

Formula Used:

LCM of fractions = LCM of numerators ÷ HCF of denominators

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Calculation:

=> Convert 12.8 to its simplest fraction: 128/10 = 64/5

=> Convert 0.004 to its simplest fraction: 4/1000 = 1/250

=> Find the LCM of the numerators (64 and 1) = 64

=> Find the HCF of the denominators (5 and 250) = 5

=> LCM of the fractions = 64 ÷ 5

=> LCM = 12.8

Therefore The correct answer is 12.8.

Additional Information

HCF of Decimals

Make the decimal places equal, find the HCF of the numbers as integers, and place the decimal point back.

HCF of Fractions

HCF = HCF of numerators ÷ LCM of denominators.

Product of Two Numbers

For any two numbers A and B: LCM(A, B) × HCF(A, B) = A × B.

Simplification of Fractions

Always convert decimal numbers to their simplest fractional forms before applying the LCM or HCF formulas to avoid calculation errors.

Q66. Answer: (b) 25%

Shortcut Trick

For 'Buy X Get Y Free' schemes, the discount percentage is calculated on the total items given.

Discount % = [Free Items ÷ Total Items] × 100

=> Discount % = [10 ÷ (30 + 10)] × 100

=> Discount % = (10 ÷ 40) × 100 = 25%

Therefore The correct answer is 25%.

Alternate Method

Given:

Number of articles bought (Paid) = 30

Number of free articles (Discount) = 10

Total = 40 Items (Marked Price Base)

30 Items Paid

10 Free

Discount

Discount % = (10 ÷ 40) × 100

Calculations:

=> Let the Marked Price (MP) of 1 article be 1 unit.

=> Total articles taken by the customer = 30 + 10 = 40.

=> Total Marked Price (MP) = 40 units.

=> Total Selling Price (SP) = 30 units (since the customer pays for 30 articles only).

=> Discount = Total MP − Total SP

=> Discount = 40 − 30 = 10 units.

=> Discount Percentage = (Discount ÷ Total MP) × 100

=> Discount Percentage = (10 ÷ 40) × 100

=> Discount Percentage = 25%

Therefore The correct answer is 25%.

Additional Information

Buy X Get Y Free Rule

In any scheme offering free articles, the discount is always calculated on the total number of articles the customer takes home. Discount % = [Y ÷ (X + Y)] × 100.

Marked Price vs Cost Price

Marked price is the price printed on an article. Discount is always evaluated on the Marked Price (MP) unless specified otherwise.

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Discount = MP − SP.

Successive Discounts

If two successive discounts of a% and b% are given, the equivalent single discount is given by the formula: [a + b − (a × b ÷ 100)]%.

Q67. Answer: (a) -(43)/(16)

Shortcut Trick

Expand the brackets directly to cancel out the x^2 terms:

=> $10x^2 − 35 − 10x^2 − 16x + 4 = 12$

=> $−16x − 31 = 12$

=> $−16x = 43 \rightarrow x = −43/16$

Therefore The correct answer is −(43)/(16).

Alternate Method

Given:

$5(2x^2 − 7) − 2(5x^2 + 8x − 2) = 12$

Calculation:

=> Apply the distributive property to expand the terms.

=> $5 × 2x^2 − 5 × 7 − 2 × 5x^2 − 2 × 8x − 2 × (−2) = 12$

=> $10x^2 − 35 − 10x^2 − 16x + 4 = 12$

=> Group the like terms together.

=> $(10x^2 − 10x^2) − 16x − 35 + 4 = 12$

=> $0 − 16x − 31 = 12$

=> $−16x = 12 + 31$

=> $−16x = 43$

=> $x = −43 / 16$

Therefore The correct answer is −(43)/(16).

Additional Information

BODMAS Rule

It defines the correct sequence of steps to solve mathematical expressions: Brackets, Orders (powers/roots), Division, Multiplication, Addition, and Subtraction.

Distributive Property

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

Linear Equation

An equation where the highest power of the variable is 1. When the higher powers (like x^2) cancel out, the equation reduces to a simple linear form.

Q68. Answer: (a) Rs. 4,100

Shortcut Trick

Given 3A = 6B = 2C. Find their direct ratio by dividing the LCM of coefficients (6) by each coefficient.

Ratio A : B : C = 6/3 : 6/6 : 6/2 = 2 : 1 : 3.

Total ratio parts = 2 + 1 + 3 = 6 parts.

A's share = (2 ÷ 6) × 12300 = Rs. 4,100.

Therefore The correct answer is Rs. 4,100.

Alternate Method

Given:

Total amount to be divided = Rs. 12,300

3 × A's share = 6 × B's share = 2 × C's share

Total Sum = Rs. 12,300 (6 parts)

A : 2 parts

B : 1 part

C : 3 parts

A's Share = ?

1 part = Rs. 12,300 ÷ 6 = Rs. 2,050
A's share = 2 × 2050 = Rs. 4,100
Calculations:
=> Let 3A = 6B = 2C = k
=> A = k/3, B = k/6, C = k/2
=> Ratio of shares A : B : C = 1/3 : 1/6 : 1/2
=> Multiplying by the LCM of denominators (3, 6, 2) which is 6:
=> A : B : C = (1/3 × 6) : (1/6 × 6) : (1/2 × 6)
=> A : B : C = 2 : 1 : 3
=> Sum of the ratio parts = 2 + 1 + 3 = 6 parts
=> 6 parts = Rs. 12,300
=> 1 part = 12300 ÷ 6 = Rs. 2,050
=> Share of A = 2 parts = 2 × 2050 = Rs. 4,100
Therefore The correct answer is Rs. 4,100.
Additional Information
Compound Ratio
When two or more ratios are multiplied term by term, the result is a compound ratio. For a:b and c:d, the compound ratio is ac:bd.
Duplicate & Sub-duplicate Ratio
The duplicate ratio of a:b is $a^2:b^2$ and the sub-duplicate ratio is √a:√b.
Proportion Rule
If a:b :: c:d, then Product of Extremes = Product of Means, i.e., a × d = b × c.

Q69. Answer: (b) 50^(-29)

Shortcut Trick
For expressions with identical bases, multiplication adds the exponents and division subtracts the exponents.
Given expression: 50^(-6) ÷ 50^(18) × 50^(-5)
Directly combine the exponents: -6 − 18 + (-5) = -29
Result = 50^(-29)
Therefore The correct answer is 50^(-29).
Alternate Method
Given:
50^(-6) ÷ 50^(18) × 50^(-5)
Formula Used:
a^m ÷ a^n = a^(m−n)
a^m × a^n = a^(m+n)
Calculation:
=> (50^(-6) ÷ 50^(18)) × 50^(-5)
=> 50^(-6 − 18) × 50^(-5)
=> 50^(-24) × 50^(-5)
=> 50^(-24 + (-5))
=> 50^(-29)
Therefore The correct answer is 50^(-29).
Additional Information
Product Rule for Exponents
When multiplying expressions with the same base, you add the exponents together: a^m × a^n = a^(m+n).
Quotient Rule for Exponents
When dividing expressions with the same base, you subtract the exponents: a^m ÷ a^n = a^(m−n).
Power of a Power Rule
When raising a power to another power, you multiply the exponents: $(a^m)^n$ = a^(m×n).
Negative Exponent Rule
A negative exponent indicates the reciprocal of the base raised to the positive exponent: a^(-n) = 1 ÷ a^n.

Q70. Answer: (b) 23

Shortcut Trick

For an odd number of observations, sort the sequence and pick the exact middle value.

Ascending order: 8, 13, 14, 15, 23, 26, 35, 36, 50.

The total terms are 9, so the middle term is the 5^(th) one.

The 5^(th) term is 23.

Therefore The correct answer is 23.

Alternate Method

Given:

Data set: 26, 13, 14, 15, 8, 36, 23, 35, 50

Total number of terms (n) = 9

Formula Used:

If n is odd, Median = ((n + 1) ÷ 2)^(th) term of the sorted data.

Sorted Data Set

8

13

14

15

23

26

35

36

50

Median = 5th Term

Calculations:

=> Arranging data in ascending order: 8, 13, 14, 15, 23, 26, 35, 36, 50

=> Median position = (n + 1) ÷ 2

=> Median position = (9 + 1) ÷ 2 = 10 ÷ 2

=> Median position = 5^(th) term

=> From the sorted data set, the 5^(th) term is 23.

Therefore The correct answer is 23.

Additional Information

Mean

The arithmetic average of all observations. Formula: Mean = Sum of observations ÷ Total number of observations.

Mode

The value that occurs most frequently in the given data set.

Empirical Relationship

For a moderately skewed distribution, the relationship is defined as: Mode ≈ 3 × Median − 2 × Mean.

Q71. Answer: (a) Southeast

Given:

Town H is to the east of town R and to the north of town D.

Town E is southeast of town H.

So, D lies in the quadrant that is Southeast of R.

Hence, the correct answer is "Option 1".

Q72. Answer: (b) Two

Given: (Left) > 5 * \ + 9 & 6 # 6 4 $ & / @ # $ & 8 3 < (Right)

Now,

Symbols are there that are immediately preceded by a number and also immediately followed by another symbol

So, Needed pattern is: Number - Symbol - Symbol.

There are 2 Symbols which are preceded by a number and also immediately followed by a number.

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Hence, the correct answer is 'Option 2'.

Q73. Answer: (a) One

Given: A, B, C, D, Q, R and S are sitting around a circular table, facing the centre of the table

1) Q sits to the immediate right of D.

2) Only three people sit between Q and S, when counted from the left of Q.

3) Only three people sit between D and C.

4) A sits to the immediate right of R.

So, B will sit on the remaining place.

Here, Only one person sit between D and R, when counted from the right of R.

Hence, the correct answer is "Option 1".

Q74. Answer: (c) FROM - RFOM - MRFO

Now,

JUNK - UJNK - KUJN

LACK - ALCK - KALC

Let's check each Option One by One.

Option 1) BUNS - UBNS - SUNB

B	U	N	S
1	2	3	4
U	B	N	S
2	1	3	4
S	U	N	B
4	2	3	1

Option 2) MOST - OMST - OSTM

M	O	S	T
1	2	3	4
O	M	S	T
2	1	3	4
O	S	T	M
2	3	4	1

Option 3) FROM - RFOM - MRFO

F	R	O	M
1	2	3	4
R	F	O	M
2	1	3	4
M	R	F	O
4	2	1	3

Option 4) MOCK - MCOK - KCOM

M	O	C	K
1	2	3	4
M	C	O	K
1	3	2	4
K	C	O	M

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4	3	2	1

So, Only FROM - RFOM - MRFO follows the pattern of given letter cluster.

Hence, the correct answer is 'Option 3'.

Q75. Answer: (d) 7

BODMAS Table:

Given equation: 51 + 8 − 8 ÷ 80 × 4 = ?

Now, if '+' and '-' and '×' and '÷' are interchanged, then: 51 − 8 × 8 + 80 ÷ 4 = ?

=> 51 − 8 × 8 + (80 ÷ 4)

=> 51 − (8 × 8) + 20

=> 51 − 64 + 20

=> −13 + 20 = 7

Hence, the correct answer is "Option 4".

Q76. Answer: (c) GBI

The logic followed here is:

Option 1) OJR

Option 2) JEM

Option 3) GBI

Option 4) LGO

Here, 'GBI' is odd among the given options.

Hence, the correct answer is "Option 3".

Q77. Answer: (b) 120

he logic followed here is:

thus, "120" will replace the question mark in the given series.

Hence, the correct option is "Option 2".

Q78. Answer: (d) 7

The logic followed here is:

"EARS' is coded as '4259'

'SARI' is coded as '9725'

So, '7' is the code for 'I' in the given code language

Hence, the correct answer is "Option 4".

Q79. Answer: (b) 1

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 below F.

2) Only two boxes are kept between F and A.

3) Only D is kept immediately above B.

4) C is kept at some place below G and at some place above E.

D
B
G
F
C
E
A

So, there is 'One' box kept between B and F

Hence, the correct answer is "Option 2".

Q80. Answer: (c) EGB

The logic followed here is:

Option 1) LNH

Option 2) GIC

Option 3) EGB

Option 4) IKE

Here, 'EGB' is odd among the given options.

Hence, the correct answer is "Option 3".

Q81. Answer: (b) 45

BODMAS Table:

Given equation: 18 − 2 + 48 × 4 ÷ 21 = ?

Now, if sign are interchanged, then:

=> 18 × 2 − 48 ÷ 4 + 21 = ?

=> (18 × 2) − (48 ÷ 4) + 21

=> 36 − 12 + 21

=> 24 + 21

=> 45

Hence, the correct answer is "Option 2".

Q82. Answer: (d) Both conclusions (I) and (II) follow.

Given Statements:

All cars are buses.

Some cars are trucks.

The least possible Venn diagram for the given statement is:

Conclusions:

I. Some trucks are cars.

If there is an intersection between set A (Cars) and set C (Trucks), then it is always true that Some C are A.

Therefore, conclusion (I) logically follows.

II. Some buses are cars.

The statement All A are B always implies that Some B are A. (Since all cars are buses, the set of buses must contain the set of cars, meaning some members of the 'Buses' set are also 'Cars').

Therefore, conclusion (II) logically follows.

So, Both conclusions (I) and (II) follow.

Hence, the correct answer is "Option 4".

Q83. Answer: (a) SANK - ASNK - KASN

The logic followed here is:

COME - OCME - EOCM

C O M E O C M E E O C M

And,

NEAT - ENAT - TENA

N E A T E N A T T E N A

Similarly,

SANK - ASNK - KASN

S A N K A S N K K A S N

Hence, the correct answer is "Option 1"

Q84. Answer: (b) (38, 8, 304)

The logic followed here is:

Logic: 1st number × 2nd number = 3rd number.

Now,

First row - (38, 12, 456)

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→ 38 × 12 = 456.

Second row - (44, 11, 484)

→ 44 × 11 = 484

Now, checking the options:

Option 1) (67, 5, 365)

=> (67 × 5) ≠ 365

Option 2) (38, 8, 304)

=> (38 × 8) = 304

Option 3) (61, 4, 254)

=> (61 × 4) ≠ 254

Option 4) (43, 6, 278)

=> (43× 6) ≠ 278

Hence, the correct option is "Option 2"

Q85. Answer: (a) 8 km to the west

Given:

Harry starts from Point A and drives 1 km towards the south.

He then takes a right turn and drives 7 km, then turns right and drives 8 km.

He then takes a right turn and drives 15 km.

He takes a final right turn, drives 7 km and stops at Point P.

So, He should drive 8 km to the west in order to reach Point A again.

Hence, the correct answer is "Option 1".

Q86. Answer: (b) G

Given: Seven boxes U, V, W, X, E, F and G are kept one over the other but not necessarily in the same order.

1) Only two boxes are kept between V and X.

2) Only W is kept above F.

3) No box is kept below X.

4) E is kept at some place below G but at some place above U.

W
F
G
V
E
U
X

So, 'G' is kept third above U

Hence, the correct answer is "Option 2".

Q87. Answer: (d) Only conclusion (I) follows.

Given Statements:

All trams are cows.

No cow is a bun.

The least possible Venn diagram for the given statement is:

Conclusions:

I. No tram is a bun.

Since all Trams are inside the set of Cows (Statement 1), and the entire set of Cows is separate from the Buns (Statement 2), it is impossible for any Tram to be a Bun.

Conclusion (I) logically follows (is true).

II. Some buns are cows.

Statement 2 explicitly states: "No cow is a bun," meaning there is zero overlap between Cows and Buns.
Conclusion (II) directly contradicts this, as it suggests some overlap exists.
Conclusion (II) does not follow (is false).
Hence, the correct answer is "Option 4".

Q88. Answer: (a) AEMZ

The logic followed here is:
For, SWER is related to GKSF
For, WAIV is related to KOWJ
Similarly, for 'MQYL'
So, "MQYL' will be related to 'AEMZ'
Hence, the correct answer is "Option 1".

Q89. Answer: (c) Three

Original Number: 19758436
The constituent digits are: 1, 9, 7, 5, 8, 4, 3, 6.
Arrange the Digits in Descending Order (Left to Right)
The new number formed is 98765431
The position(s) of 3 digits (7, 4, 3) will remain unchanged as compared to that in the original number
Hence, the correct answer is "Option 3"

Q90. Answer: (b) 10

Original Number: 8934612
The constituent digits are: 8, 9, 3, 4, 6, 1, 2.
Arrange the Digits in Descending Order (Left to Right)
The new number formed is 1234689
Sum of the digits that are second from the left and second from the right in the new number thus formed:
Sum = 2 + 8 = 10
Hence, the correct answer is "Option 3"

Q91. Answer: (a) 130

The logic followed here is:
thus, "130" will replace the question mark in the given series.
Hence, the correct option is "Option 1".

Q92. Answer: (b) 73

The logic followed here is:
thus, "73" will replace the question mark in the given series.
Hence, the correct option is "Option 2".

Q93. Answer: (a) One

Given: Seven people, D, E, F, G, H, I and X, are sitting in a row facing North.
1) Only two people sit to the left of G.
2) Only three people sit between G and H.
3) Only one person sits between H and F.
4) E sits to the immediate left of I.
5) D is not an immediate neighbour of H.
And, N will sit at the remaining place.
So, There is only 1 person who sit to the right of X.
Hence, the correct answer is "Option 1".

Q94. Answer: (a) ZZA -3

The logic followed here is:
So, 'ZZA -3' will replace the question mark in the given series.

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Hence, the correct answer is "Option 1".

Q95. Answer: (c) 9

Given: (Left) 7 $ % 4 & 1 9 @ 5 & 3 Ω 8 * 2 £ # 6 (Right)

Now,

Symbols are dropped from the series :

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

The number which is sixth from the right: 9

Hence, the correct answer is 'Option 3'.

Q96. Answer: (c) ZIG

The logic followed here is:

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

Hence, the correct answer is "Option 3".

Q97. Answer: (a) Z

Given: Seven boxes V, W, X, Y, Z, Q and R are kept one over the other but not necessarily in the same order.

1) Only two boxes are kept between Q and V.

2) Only Y is kept above W.

3) No box is kept below V.

4) X is kept at some place below Z but at some place above R.

Y
W
Z
Q
X
R
V

So, 'Z' is kept third above R

Hence, the correct answer is "Option 1".

Q98. Answer: (c) DZB

The logic followed here is:

Option 1) EAW

Option 2) OKG

Option 3) DZB

Option 4) MIE

Here, 'DZB' is odd among the given options.

Hence, the correct answer is "Option 3".

Q99. Answer: (c) Mother

Family Chart:

Given:

A is the son of S.

D is the daughter of F.

F is the father of G.

G is the sister of A.

A is married to Q.

W is the son of A.

So, S is 'Mother' of D.

Hence, the correct answer is "Option 3".

Q100. Answer: (c) 4

The logic followed here is:
‘FOUR’ is coded as ‘5427’
‘RISE’ is coded as ‘6143’
R is common in both words and 4 is common in both number codes.
So, '4' is the code for ‘R’ in the given code language.
Hence, the correct answer is "Option 2".

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