RRB NTPC CBT 2 (Level-5) Official Paper (Held On: 12 June 2022 Shift 1) (Previous Year Paper)

RRB NTPC • 2022 • 120 questions • 90 minutes • Answer key and solutions

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FULL TEST

Q1. Which Article of the Indian Constitution is related with the oath or affirmation by judges of high courts?

(a) 187
(b) 256
(c) 219
(d) 231

Q2. An information is given, followed by two statements labelled I and II. Identify which of the statements is/are possible reason(s) behind the given information.

Information:

Due to COVID, schools will have to operate on a hybrid model i.e. online as well as physical school.

Statements:

I. Many parents are still not willing to send their children to places with large gatherings owing to a pandemic

II. In schools, seating capacity will not be adequate to accommodate all the enrolled students owing to the social distancing norms.

(a) Neither statement I nor II is a possible reason.
(b) Both statements I and II are possible reasons.
(c) Only statement I is a possible reason.
(d) Only statement II is a possible reason.

Q3. The reproductive parts in animals produce male and female gametes that fuse to form a _____.

(a) Ovum
(b) Foetus
(c) Embryo
(d) Zygote

Q4. Indian men's hockey team won bronze medal by defeating which country in Tokyo 2020 Summer Olympics in August 2021?

(a) Australia
(b) Germany
(c) Netherland
(d) Belgium

Q5. The Sanskrit drama 'Ratnavali', about the love story of Princess Ratnavali is said to have been written by _____.

(a) Kalidasa
(b) Harsha
(c) Bhavabhuti
(d) Vishakhadutta

Q6. Read the given statements and conclusions carefully. Decide which of the given conclusion/s follow based on the statements.

Statements: P > Z, N < T, M > N, Z > M

Conclusions:

I. P < T

II. N < Z

(a) Neither I nor II is true
(b) Both I and II are true
(c) Only II is true
(d) Only I is true

Q7. As of February 2022, how many elements are there in the Modern Periodic Table?

(a) 148
(b) 118
(c) 108
(d) 138

Q8. Rubi and Juhi are sisters. Krishna is Juhi's father's father. Reshma is the mother of Arvind. Arvind is the father of Rohit, who is the only brother of Rubi. How is Krishna related to Rohit?

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

Q9. Six people A, B, C, D, E and F are sitting around a circular table facing the centre. C sits second to the left of B. E is an immediate neighbour of B. F sits third to the left of E. D sits second to the left of A.

Who sits to the immediate right of A ?

(a) E
(b) B
(c) C
(d) F

Q10. If $6y^2 - 13y + 6 = 0$, then find the product of the two roots of the equation.

(a) −1
(b) 1
(c) (−13)/6
(d) 13/6

Q11. The surface area of a sphere is 61600 sq. cm. Find the volume of the sphere (in cu m). [Use π = 22/7]

(a) 4.312/3
(b) 4.312
(c) 43.12/3
(d) 43.12

Q12. There are 3 badminton players in each stream-Commerce, Science and Arts. A, B and C are from Commerce. P, Q and R are from Science. J, K and L are from Arts. A team of 4 badminton players are to be sent for a tournament with following conditions:

(i) There must be at least one student from each stream.

(ii) P will not go with Q or R.

(iii) A and C will always go together.

(iv) K and L will always go together.

Which of the following combinations of players is a possible combination for the tournament?

(a) A, C, P and J
(b) A, Q, R and J

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(c) B, Q, J and K
(d) B, P, R and J

Q13. Valley of the Kings - one of the most important archaeological sites in the world is located in _____.
(a) Egypt
(b) Norway
(c) Turkey
(d) Thailand

Q14. The following question is based on the given words.
PLAN FORE RAMP RANG SAND
If in each word, the fourth letter is changed to the next letter in the English alphabetical order, how many letter clusters thus formed will have two vowels?
(a) Two
(b) Three
(c) None
(d) One

Q15. From the given options, which two numbers should be interchanged so that the value of Y becomes 29?
$6 \times 4 - 5 + 9 \div 3 = Y$
(a) 5 and 3
(b) 4 and 5
(c) 6 and 9
(d) 9 and 3

Q16. If $\sqrt{3} \tan 2\theta - 3 = 0$, then find the value of $\tan \theta \sec \theta - \sin \theta$ where $0 < \theta < 90°$
(a) 7/6
(b) 5/6
(c) 2/3
(d) 1/6

Q17. In which of the following years was the Bengal State Prisoners Regulation (Bengal Regulation III) passed?
(a) 1876
(b) 1857
(c) 1818
(d) 1812

Q18. $9/15 \times 45/81 \times\{49/6 \times(16/7-2)\} \times 24/5 \div 16/15 = ?$
(a) 5/9
(b) 7/2
(c) 2/7
(d) 9/5

Q19. Which of the following is NOT an example of rocks?
(a) Granite
(b) Asphalt
(c) Schist
(d) Basalt

Q20. Alha singing is a prominent genre of folk songs of some parts of:
(a) Assam
(b) Punjab
(c) Uttar Pradesh
(d) Odisha

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Q21. Who received the World Food Prize 2021, for unlocking the benefits of fish for diet, health and livelihood Across the Global South?

(a) Dr Shakuntala Haraksingh Thilsted
(b) Dr Rattan Lal
(c) Dr Sanjaya Rajaram
(d) Dr Modadugu Vijay Gupta

Q22. A circular racing track has been developed in a field. If the difference between the outer circumference and the inner circumference of the racing track is 33 m, then find the width of the track (in m).

(Use π = 22/7)

(a) 51/4
(b) 53/4
(c) 51/5
(d) 43/4

Q23. Two chords AB and CD of a circle intersect at a point F outside the circle.

If AF = 12 cm, BF = 4 cm and CF = 16 cm, find the length of CD.

(a) 13 cm
(b) 12 cm
(c) 11 cm
(d) 10 cm

Q24. Which of the following numbers is divisible by 30?

(a) 34560
(b) 45670
(c) 23450
(d) 12340

Q25. The Valmiki Ambedkar Awas Yojana is aimed at providing:

(a) infrastructure for all the citizens
(b) housing and toilet facilities to slum dwellers living below poverty line
(c) Foodgrains to slum dwellers living below poverty line
(d) financial assistance to slum dwellers living below poverty line

Q26. What is the smallest cubic number, which is divisible by 72,108 and 300?

(a) 3375
(b) 27000
(c) 5400
(d) 21600

Q27. Into how many books is the Akbar Nama divided?

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

Q28. Which of the following lakes is a brackish water lake?

(a) Pulicat Lake
(b) Dal Lake
(c) Loktak Lake
(d) Wular Lake

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Q29. The length of each edge of a cube is 2.6 cm. What is the total surface area (in cm^2) of the cube?

(a) 39.96
(b) 40.56
(c) 40.76
(d) 40.36

Q30. Ravi has to go from Hyderabad to Delhi. The distance between Hyderabad and Delhi is 1,200 kms. He decides to travel 25% of the distance on foot, 30% of the distance by bus, 15% of the distance by train and the remaining distance by an airplane. What is the distance travelled by Ravi by an Airplane?

(a) 300 km
(b) 360 km
(c) 580 km
(d) 425 km

Q31. Who among the following is the supreme commander of the Indian armed forces?

(a) Prime Minister
(b) President
(c) Defence Minister
(d) Speaker of Lok Sabha

Q32. Which of the following is an example of a living fossil tree?

(a) Ginkgo biloba
(b) Funaria
(c) Silver oak
(d) Dryopteris

Q33. Which of the following options is the closest approximate value which will come in place of question mark(?) in the following equation?

$67.96 + 5.12 - 0.89 \div 31.88 = ?$

(a) 73
(b) 35
(c) 48
(d) 150

Q34. A certain sum amounts to Rs. 22,494 in 7 years at x% per annum on simple interest. If the rate of simple interest per annum had been (x + 4)%, the amount payable after 7 years would have been Rs. 25,917. Find the sum invested.

(a) Rs. 11,975
(b) Rs. 12,275
(c) Rs. 12,175
(d) Rs. 12,225

Q35. The Sattriya dance form was introduced by _____ in 15^(th) Century AD in Assam.

(a) Mahapurusha Srimanta Sankaradeva
(b) Raja Bhag Chandra
(c) Guru Pankaj Charandas
(d) Jayaprabha Menon

Q36. Study the given information carefully and answer the question that follows.

In a boat, people are sitting in two parallel rows, with five people each in a row, in such a way that there is equal distance between adjacent persons.

In the first row, Mani, Nani, Alex, Puri and Tuli are seated (not necessarily in the same order) and all of them are facing south.

In the second row, Sharma, Atkin, Putin, Neha and Priya are seated (not necessarily in the same order) and all of them are facing north.

Therefore, people in the opposite rows face each other in this arrangement. Priya sits third to the right of Atkin. Atkin

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sits at one of the extreme ends. Sharma sits second to the left of Priya. The person facing Sharma sits to the immediate right of Nani. Puri sits second to left of Nani. Mani is not an immediate neighbour of Nani. Only two people sit between Mani and Alex. Neither Nani nor Mani faces Neha.

Who among the following is facing Tuli?

(a) Sharma
(b) Priya
(c) Neha
(d) Atkin

Q37. In a certain code language, 'cip civ cin' is written as 'life is good', 'cip cin er' is written as 'love is life'. How will 'love' be written as in that language?

(a) cin
(b) oob
(c) er
(d) cip

Q38. Read the given statements and conclusions carefully. Decide which of the given conclusions is/are true based on the statements.

Statements:

$A > Z \geq P > M$

$P < R$

Conclusions:

I. $A > R$

II. $M < R$

(a) Only II is true
(b) Only I is true
(c) Neither I nor II is true
(d) Both I and II are true

Q39. In which Schedule of the Constitution of India were 22 languages mentioned?

(a) 8th Schedule
(b) 4th Schedule
(c) 5th Schedule
(d) 3rd Schedule

Q40. In a mixture of 90 litres, the ratio of milk to water is 4 : 1. In another mixture of 90 litres, the ratio of milk to water is 3 : 2. What is the positive difference between the quantities of milk in the two mixtures?

(a) 23 litres
(b) 18 litres
(c) 16 litres
(d) 22 litres

Q41. Sudhir is 4.5 times as efficient as Aarav. If they work together, they can complete a piece of work in 8 days. How many days will Aarav take to do the same work alone?

(a) 36
(b) 48
(c) 44
(d) 40

Q42. Which of the following countries does NOT have direct access to a sea?

(a) Myanmar
(b) Bangladesh
(c) Nepal
(d) Pakistan

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Q43. A solid metallic sphere of radius 3 cm is melted and drawn into a wire of thickness 4 mm. What is the length of the wire (in m)?

(a) 9.25
(b) 7.5
(c) 9
(d) 8

Q44. Who approved a policy on declassification of war histories in June 2021?

(a) Amit Shah
(b) Jyotiraditya M Scindia
(c) Rajnath Singh
(d) Narendra Modi

Q45. What is the default alignment of numbers in an Excel Worksheet?

(a) Justify
(b) Center
(c) Right
(d) Left

Q46. 'Huli Vesha' is a popular folk dance in the coastal region of _____.

(a) Kerala
(b) Odisha
(c) Gujarat
(d) Karnataka

Q47. In which type of chemical reaction do crystals of ferrous sulphate lose water on heating and the colour of the crystals changes from light green to white?

(a) Decomposition reaction
(b) Combination reaction
(c) Displacement reaction
(d) Double displacement reaction

Q48. A sum of Rs. 9,800 was invested for a year at 10% interest per annum, compounded half-yearly. What would been the interest payable at the end of the year?

(a) Rs. 1,003.50
(b) Rs. 1,004.50
(c) Rs. 1,005.60
(d) Rs. 980

Q49. In the data set given below, what is the difference between the Median and the Mode?

{2.1, 5, 6, 7, 8, 9.3, 11, 15, 17, 19.21, 27, 31, 31, 33, 16.5, 14, 10}

(a) 19
(b) 17
(c) 10
(d) 15

Q50. As per UN (World Population Prospects 2019), _____ led the ranking for countries with the highest population density in 2019.

(a) Netherlands
(b) Sweden
(c) Hong Kong
(d) Monaco

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Q51. Select the combination of letters that when sequentially placed in the blanks of the given series will complete the series.

A_ _BD_CEB_ _CEB_

(a) CEADAD
(b) CDADEA
(c) CADADE
(d) CDAEAD

Q52. There are eight persons-Manoj, Nitya, Varun, Pranay, Kali, Reva, Sarayu and Teena. All of them are sitting in a straight row and are facing North but not necessarily in the same order. There are only two persons sitting between Reva and Pranay. The number of persons sitting between Kali and Manoj is the same as the number of persons sitting between Pranay and Sarayu. Varun is not a neighbour of Sarayu. Sarayu is sitting to the immediate left of Nitya. Kali is sitting second to the left of Reva. Reva is fourth from the extreme right end. Manoj sits at one of the extreme ends of the row. Teena sits to the immediate right of Kali. How many persons are seated to the left of Nitya?

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

Q53. Which of the following states has zero Scheduled Tribe population as per Census 2011?

(a) West Bengal
(b) Maharashtra
(c) Punjab
(d) Assam

Q54. How many gold medals did India win in the Asian Junior Boxing Championship 2021 in Dubai?

(a) Six
(b) Five
(c) Eight
(d) Seven

Q55. A can complete 12% of the work in 15% of the allotted time. A and B worked for the entire period of the allotted time and the work got completed on time. What portion of the work was done by B?

(a) 10%
(b) 20%
(c) 15%
(d) 25%

Q56. As of December 2021, the number of High Courts in India are _____.

(a) 25
(b) 30
(c) 28
(d) 20

Q57. When we divide NNP (Net national product) by the total population of a nation we get _____.

(a) per capita income
(b) resource growth
(c) Gross National Product
(d) external dividend

Q58. Read the given statements and conclusions carefully. Decide which of the given conclusions is/are true based on the statements.

Statements:

K = P < C; P > Q; Q > L

Conclusions:

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I. Q < C

II. K > L

(a) Both conclusions I and II are true
(b) Neither conclusion I nor II is true
(c) Only conclusion II is true
(d) Only conclusion I is true

Q59. The average weight of 14 students of a class is 20 kg. If a student leaves the class, the average weight of the class drops by 2 kg. Find the weight of the student (in kg) who left the class.

(a) 43
(b) 45
(c) 46
(d) 49

Q60. Where was the first 'Open Rock Museum' inaugurated by the Union Minister of State for Science & Technology and Earth Sciences, on January 6, 2022?

(a) Hyderabad
(b) Guwahati
(c) Kochi
(d) Bhubaneshwar

Q61. The first railway line in India was laid in the year 1853 from Bombay to _____.

(a) Thane
(b) Nagpur
(c) Pune
(d) Nasik

Q62. Which of the following economic activities falls under the primary sector?

(a) Mining
(b) Education
(c) Banking
(d) Manufacturing

Q63. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

All men are robots.

All robots are machines.

Conclusions:

I. All machines are men.

II. Some robots are men.

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

Q64. With reference to the Green Revolution in India, what is the full form of HYVP?

(a) High-Yielding Varieties Programme
(b) High-Yielding Varieties Plants
(c) High-Yielding Varieties Pattern
(d) High-Yielding Varieties Patent

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Q65. The sum of two numbers is 17 while the sum of their squares is 157. Find the sum of the cubes of those two numbers.

(a) 3791
(b) 3094
(c) 1491
(d) 1547

Q66. The area of a rectangle is 453.6 m². If its length is 27 m, then what is the perimeter of the rectangle?

(a) 86.6 m
(b) 87.6 m
(c) 85.4 m
(d) 89.8 m

Q67. Ramdin started from his office and walked 15 km in the south direction and reached the bus stop, and then turned to his left and walked 8 km straight on the road. From there, he turned to his left, walked 15 km and reached the Central Library. After this, he turned to his left again and walked 4 km to reach his hostel. How far and in which direction is the hostel with respect to his office?

(a) 12 km towards North
(b) 7 km towards South
(c) 4 km towards West
(d) 4 km towards East

Q68. Find the product of the greatest among the numbers 0.82, 0.802, 0.85, 0.085 with the smallest among the numbers 0.3, 0.03, 0.203, 2.03

(a) 0.246
(b) 0.0255
(c) 0.0225
(d) 0.2406

Q69. Which of the following sites of Indus Valley Civilization is located in Punjab (India)?

(a) Banawali
(b) Balu
(c) Kot Diji
(d) Ropar

Q70. The amount payable on maturity of a certain sum which is invested for 5 years at a certain rate per cent p. a. is Rs. 9,800 and the amount payable on the same sum invested for 10 years at the same rate is Rs. 12,600. If simple interest is offered in both cases, the rate of interest p. a. is:

(a) 10%
(b) 7.8%
(c) 8.5%
(d) 8%

Q71. In each of the number-pairs, the second number is obtained by performing a certain mathematical operation on the first number. Three of the following pairs follow the same pattern and thus form a group. Select the number-pair that does NOT belong to that group.

(a) 21 : 420
(b) 25 : 600
(c) 17 : 272
(d) 15 : 208

Q72. Ten people are sitting in two parallel rows 1 and 2. A, B, C, D and E are sitting in row 1 facing the North and V, W, X, Y and Z are sitting in row 2 facing the South, in such a way that each member in row 1 faces a member of row 2.

Neither A nor B sit at any of the extreme ends of the row. A sits second to the right of B. The one who faces B is an immediate neighbour of Z. Y sits second to the left of Z. The one who faces Y sits second to the left of C. W sits second to the right of V. D is not an immediate neighbour of A.

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Who faces E?

(a) Y
(b) W
(c) V
(d) X

Q73. In a class, four students ranked between Rahul and Sreeja. Sreeja ranked 14^(th) from the top while Rahul ranked 7^(th) from the bottom. How many students are there in the class?

(a) 25
(b) 26
(c) 21
(d) 20

Q74. Which type of missile was the Python-5 test fired by DRDO in April 2021?

(a) Air-to-Air Missile
(b) Anti-radiation Missile
(c) Air-to-Surface Missile
(d) Surface-to-Surface Missile

Q75. The famous Sardar Sarovar dam has been built on which of the following rivers?

(a) Narmada
(b) Sutlej
(c) Ganga
(d) Godavari

Q76. Sunita won 3/5 of the marbles that were there in the beginning of the game. Ravi won 2/3 of the remaining marbles while Sunny won the remaining 60 marbles. How many marbles did Sunita win?

(a) 240
(b) 285
(c) 270
(d) 255

Q77. BYTEW is related to YWTEB following a certain logic. Following the same logic, AMFQC is related to QMFCA. Which of the following is TILDW related to following the same logic?

(a) LTIWD
(b) WTLID
(c) WILDT
(d) WLITD

Q78. Who among the following was a British reformer, a campaigner for women's rights and a supporter of Indian nationalism?

(a) Annie Besant
(b) Josephine Butler
(c) Florence Nightingale
(d) William Wilberforce

Q79. Which of the following ports is located on the western coast of India?

(a) Ennore
(b) Haldia
(c) Cochin
(d) Paradip

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Q80. A family spends Rs. 4,600, Rs. 5,600, Rs. 4,800, Rs. 3,800, and Rs. 6,000 on groceries in the first 5 months of a year. How much should the family spend in the 6^(th) month to make the 6 months average spending of the family on groceries to Rs. 4,500?

(a) Rs. 2,200
(b) Rs. 3,650
(c) Rs. 4,500
(d) Rs. 3,500

Q81. Arushi was to multiply a number by 2.4, but instead multiplied by 4.2. If the product she obtained was 65.1, then what is the correct product that she should have got?

(a) 36.50
(b) 46.88
(c) 37.20
(d) 113.93

Q82. The intervention by the monetary authority of a country in the money market to keep the money supply stable against external shocks is called _____.

(a) sterilisation
(b) reserve deposit
(c) speculative demand
(d) statutory liquidity

Q83. Select the number from among the given options that can replace the question mark (?) in the following series.

86, 89, 95, 104, ?, 131, 149

(a) 122
(b) 116
(c) 114
(d) 113

Q84. Who laid the foundation stone of Shri Parvati Temple at Somnath in August 2021?

(a) Narendra Modi
(b) Amit Shah
(c) Bhupendra Patel
(d) Vijay Rupani

Q85. In the following question below are given some statements followed by some conclusions based on those statements. Taking the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusion logically follows the given statements.

Statements:

Some dogs are donkeys.

No donkey is a horse.

Conclusions:

I. Some dogs are not horses.

II. Some horses are dogs

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

Q86. The LCM of two numbers is 20 times their HCF, and the sum of the LCM and the HCF is 504. If the difference of the numbers is 24, then find the sum of the numbers.

(a) 210
(b) 180
(c) 225

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(d) 216

Q87. The present average age of X, Y and Z is 44 years. 8 years ago the average age of X and Y was 38 years. What is the present age of Z?

(a) 39 years
(b) 38 years
(c) 41 years
(d) 40 years

Q88. Who became the first Indian female athlete to win two individual Olympic medals?

(a) Mirabai Chanu
(b) Dutee Chand
(c) PV Sindhu
(d) Ankita Raina

Q89. In a certain code language, 'RICE' is coded as '5136', 'FUR' is coded as '327', and 'FIN' is coded as '785'. How will 'FUN' probably be coded in that language?

(a) 258
(b) 182
(c) 872
(d) 718

Q90. In each of the given number-clusters, the number on the right side of '=' (the equal to sign) is calculated by performing certain mathematical operations on the three numbers on the left of '=' (the equal to sign). All three number-clusters follow the same pattern. Select the number from among the given options that can replace the question mark (?) in the third number-cluster.

21, 9, 40 = 149

18, 7, 25 = 101

15, 11, 30 = ?

(a) 110
(b) 120
(c) 125
(d) 135

Q91. Select the letter cluster from among the given options that can replace the question mark (?) in the following series.

DI, GO, LU, OA, TG, ?

(a) WM
(b) WL
(c) YM
(d) UL

Q92. The First Human Development Report was published by the United Nations Development Programme (UNDP) in the year _____.

(a) 1905
(b) 1945
(c) 1990
(d) 1980

Q93. Study the following arrangement of letters, numbers, symbols and answer the question that follows.

(Left) € A 5 # 6 λ 5 D P A ¥ 8 R 2 Z * Q 9 B L 5 6 % $ H 2 F # 6 (Right)

How many such letters are there in the above series, each of which is immediately preceded by a symbol and immediately followed by a number?

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

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(d) 2

Q94. Which of the following is NOT a major factor affecting the population change in a region?

(a) Occupational composition
(b) Death rate
(c) Birth rate
(d) Migration

Q95. Select the option that is related to the fifth letter-cluster in the same way as the fourth letter-cluster is related to the third letter-cluster and the second letter-cluster is related to the first letter-cluster.

EYBRD : VBYIW :: DAJKO : WZQPL :: JEWAD : ?

(a) KRESD
(b) VRTYU
(c) QVDZW
(d) MHREA

Q96. Swetha correctly remembers that Ajay's exam is before Friday but after Tuesday. Kavya correctly remembers that Ajay's exam is after Wednesday but before Saturday. On which of the following days does Ajay's exam correctly fall?

(a) Tuesday
(b) Wednesday
(c) Monday
(d) Thursday

Q97. SPIC MACAY (Society for the Promotion of Indian Classical Music And Culture Amongst Youth) is a non-political, nationwide, voluntary movement founded in _____.

(a) 1979
(b) 1977
(c) 1970
(d) 1973

Q98. During the Mauryan reign which of the following provinces was considered as the Gold mine hub in Karnataka?

(a) Tosali
(b) Ujjayini
(c) Taxila
(d) Suvarnagiri

Q99. A bank is to the east of a shop. A college is to the north-west of the Bank. A bus stop is to the north of the shop and to the west of the college. In which direction is the college with respect to the shop?

(a) North-west
(b) East
(c) North-east
(d) North

Q100. Which of the following keyboard shortcut is used to lock your Windows 10 PC?

(a) Windows logo key + K
(b) Ctrl + L
(c) Ctrl + K
(d) Windows logo key + L

Q101. The spring festival celebrated by Konyak tribe of Nagaland is known as _____.

(a) Mopin
(b) Garia Pooja
(c) Myoko
(d) Aoleang Monyu

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Q102. D, E, L, M, R, S, Y and Z are sitting around a square table facing the centre of the table. Four of them are sitting at each of the corners, while the other four are sitting at the exact centre of each of the sides.

D sits in the middle of one of the sides of the table. Only one person sits between D and E. L sits to the immediate right of E. Only three people sit between L and M when counted from the right of L. R is an immediate neighbour of L. S sits to the immediate left of Y. Who sits third to the right of Z?

(a) R
(b) S
(c) Y
(d) D

Q103. Which Five-Year Plan aimed at accelerating food grain production, increasing employment opportunities and raising productivity with focus on 'food, work and productivity'?

(a) Seventh
(b) Sixth
(c) First
(d) Fourth

Q104. In 2019, archaeologists unearthed a rare treasure in the form of a life-sized stucco sculpture from _____, a Buddhist site which represents one of the Bhodhisattvas in Jathaka Chakra.

(a) Udayagiri
(b) Sarnath
(c) Khandgiri
(d) Phanigiri

Q105. A question is given, followed by two statements labelled I and II. Identify which of the statements is/are sufficient to answer the question.

Question:

How is Damini related to Bhola?

Statements:

I. Tika has only one son, Bhola and only one daughter, Kamala.

II. Damini is Roma's son's wife. Kamala is the only daughter of Roma. Meghna is the daughter of Bhola.

(a) Statement II alone is sufficient, while Statement I alone is not sufficient to answer the question.
(b) Statement I alone is sufficient, while Statement II alone is not sufficient to answer the question.
(c) Both Statements I and II together are sufficient to answer the question.
(d) Statements I and II together are not sufficient to answer the question.

Q106. A sum of money at certain rate of interest when compounded annually becomes Rs. 625 in 3 years and Rs. 675 in 4 years. What is the rate of Interest per annum?

(a) 8%
(b) 4%
(c) 7%
(d) 6%

Q107. How many technology innovation platforms have been launched by the Central Government for development of technologies for globally competitive manufacturing in India in July 2021?

(a) Six
(b) Five
(c) Eight
(d) Seven

Q108. If 32% of 22.5 − 2/3 × cbrt512 × √81 = y, then the value of y is:

(a) −40.2
(b) −41.2
(c) −40.8

(d) −41.8

Q109. Evaluate $(\cos^2(45°+\theta)+\cos^2(45°-\theta))/(\text{cosec}^2\ 30°\ \sin^2\ 45°-\sec^2\ 60°)$.

(a) −1/2
(b) −1/6
(c) 1/6
(d) 1/2

Q110. It was Thursday on February 1, 2007. What was the day of the week on February 2, 2006?

(a) Saturday
(b) Thursday
(c) Friday
(d) Wednesday

Q111. In a certain code language, 'MISTAKE' is written as 'LHRUBLF' and 'PROBLEM' is written as 'OQNCMFN'. How will 'STRANGE' be written in that language?

(a) TUSAOHF
(b) TUSBMFD
(c) RSQBOHF
(d) RSQBMFD

Q112. A train covers a distance of 57.6 km in 48 minutes. What is its speed in m/s?

(a) 20
(b) 24
(c) 21
(d) 18

Q113. A train running at 90 km/h crosses an electric pole in 18 seconds and a platform in 65 seconds. What is the length of the platform?

(a) 1175 m
(b) 1250 m
(c) 1050 m
(d) 1020 m

Q114. A shopkeeper mixes 30 kg of rice which he purchased at Rs. 30/kg and 40 kg of rice which he purchased at Rs.28/kg and he sells the entire mixture at Rs. 28/kg. What is the profit or loss percentage (approximated to nearest integer)?

(a) 3% loss
(b) 5% profit
(c) 6% loss
(d) 7% profit

Q115. 2 litres of a liquid having milk and water in the ratio 3 : 2 is mixed with 3 litres of a liquid having milk and water in the ratio 2 : 3. Find the ratio of milk to water in the new mixture.

(a) 9 : 4
(b) 5 : 6
(c) 12 : 13
(d) 1 : 1

Q116. The power of the Parliament to Amend the Constitution of India is described in:

(a) Article 360
(b) Article 352
(c) Article 368
(d) Article 395

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Q117. In a certain code language, each word is given a number code. Accordingly, 1875 means 'wound the round watch', 6143 means 'a cake is round', and 7321 means 'watch a round wheel'. Find the code for 'watch'.

(a) 8
(b) 1
(c) 5
(d) 7

Q118. _____ is defined as the output per unit of variable input.

(a) Capital products
(b) Average product
(c) Gross product
(d) Net product

Q119. The ratio of the length, width and height of a cuboid is 4 : 3 : 5 and the sum of the lengths of all its edges is 144 cm. Find the total surface area of the cuboid.

(a) 1620 cm2
(b) 1026 cm2
(c) 756 cm2
(d) 846 cm2

Q120. The following table presents the expenditure of a company on various heads over five years.

Expenditures of a company (in Lakhs)					
Year	Expenditure Heads				
Salary	Transport	Taxes	Advertising	Offers and Promotions	
2017	361	93	83	142	52
2018	273	67	65	133	86
2019	645	110	152	108	95
2020	712	108	165	112	48
2021	652	111	132	101	75

The company's total expenditure in 2017 was approximately what percentage of its total expenditure in 2021?

(a) 68%
(b) 71%
(c) 61%
(d) 55%

ANSWER KEY

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

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81	c	82	a	83	b	84	a	85	d	86	d	87	d	88	c	89	c	90	d
91	a	92	c	93	b	94	a	95	c	96	d	97	b	98	d	99	c	100	d
101	d	102	a	103	a	104	d	105	c	106	a	107	a	108	c	109	a	110	b
111	c	112	a	113	a	114	a	115	c	116	c	117	d	118	b	119	d	120	a

SOLUTIONS

Q1. Answer: (c) 219

The correct answer is 219.

Key Points

• Appointment of Judges of the High Courts is made under Articles 217 and 224 of the Constitution of India.

• Article 217 - Appointment and conditions of the office of a Judge of a High Court

• Every Judge of a High Court shall be appointed by the President by warrant under his hand and seal. Hence statement 1 is correct.

• A person shall not be qualified for appointment as a Judge of a High Court unless he is a citizen of India and—

• has for at least ten years held a judicial office in the territory of India; or

• has for at least ten years been an advocate of a High Court or of two or more such Courts in succession;

• Article 219 - Oath or affirmation by Judges of High Courts.

• Every person appointed to be a Judge of a High Court shall, before he enters upon his office, make and subscribe before the Governor of the State, or some person appointed on that behalf by him, an oath or affirmation according to the form set out for the purpose in the Third Schedule. Hence statement 2 is correct.

• Article 224 - Appointment of additional and acting Judges.

• If by reason of any temporary increase in the business of a High Court or by reason of arrears of work therein, it appears to the President that the

number of the Judges of that Court should be for the time being increased, duly qualified persons to be Additional Judges of the Court for such period not exceeding two years as he may specify.

• When any Judge of a High Court other than the Chief Justice is by reason of absence or for any another reason unable to perform the duties of his office or is appointed to act temporarily as Chief Justice,a duly qualified person to act as a Judge of that Court until the permanent Judge has resumed his duties.

• No person appointed as an additional or acting Judge of a High Court shall hold office after attaining the age of 62 years.

• Appointment of Judges of the High Courts is made under Articles 217 and 224 of the Constitution of India, which do not provide for reservation for any caste or class of persons.

Q2. Answer: (b) Both statements I and II are possible reasons.

• The existence of a pandemic and its spread due to large gatherings can discourage many parents from sending their children to school. Thus, statement I is a possible reason.

• Social distance norms would cause the requirement of increase in seating capacity to accommodate the original number of students. However, this might not be feasible for all schools. Thus, online or a hybrid model would be an appropriate choice in such a situation. Therefore, statement II is also a possible reason.

Hence, "Both statements I and II are possible reasons." is the correct answer.

Q3. Answer: (d) Zygote

The correct answer is Zygote.

Key Points

• The fusion of the male gamete and female gamete is called fertilization.

• Fertilization of gametes results in the formation of a zygote.

• Gamete formation: These are cells used during sexual production. The male gamete is sperm while the female gamete is the egg or ova.

• Fertilization: This is the process where the male and female gametes fuse to form a single cell called a zygote.

• Zygote: This is the combination of the parent gene(male and female gene) formed during fertilization.

• It contains the necessary genetic information to form a new human being.

• Embryo: This is the early stage of development of the new individual.

• The correct sequence of events is during reproduction in human beings.

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Gamete formation → Fertilization → Zygote → Embryo

Q4. Answer: (b) Germany

The correct answer is Germany.

Key Points

• Indian men's hockey team defeated Germany to win their first-ever Olympic medal in 41 years.

• It was India's third hockey bronze medal in the history of the Olympics.

• The other two came in 1968 Mexico City and the 1972 Munich Games.

Additional Information

• Hockey:

• The Hockey World cup is organised by the International Hockey Federation (FIH) once in four years.

• The headquarters of FIH is located in Lausanne, Switzerland.

• 'Blackheath Rugby and Hockey Club' was the first hockey club in the world that was set up in the year 1861 in England.

• The first Hockey World Cup was organised in Barcelona (Spain) in 1971 and the winner was Pakistan.

• India took part in Olympics for the first time in the year 1928 (in Amsterdam Olympics).

• In Olympics, India has won the hockey title a maximum of eight times.

Q5. Answer: (b) Harsha

The correct answer is Harsha.

Key Points

• Ratnavali is a Sanskrit drama about a princess Ratnavali, and a king Udayana, written by Harshvardhana.

• Nagananda, Priyadarshika, and Ratnavali are written by King Harsha.

Additional Information

• Harshvardhana :

• He was the ruler of a large empire in northern India from 606 to 647 CE.

• His reign seemed to mark a transition from the ancient to the medieval period when decentralized regional empires continually struggled for hegemony.

• He ascended the throne of Thaneshwar and Kannauj on the death of his brother, Rajyavardhana.

• The Chinese traveller, Hiuen Tsang, visited India during his reign.

• Hiuen Tsang converted Harshavardhana to Mahayana Buddhism.

• Harsha organized a religious assembly at Kanauj to honour the Chinese pilgrim Hiuen Tsang towards the close of his reign.

• The administration of Harsha was organized on the same lines as the Guptas did.

• Harsha was a great patron of learning.

• His biographer Banabhatta adorned his royal court. Besides Harshacharita, he wrote Kadambari.

• Other literary figures in Harsha's court were Matanga Divakara and the famous Barthrihari, who was the poet, philosopher, and grammarian.

• Harsha himself authored three plays - Ratnavali, Priyadarsika, and Nagananda.

Q6. Answer: (c) Only II is true

Given statements: P > Z, N < T, M > N, Z > M

On combining: P > Z > M > N < T

Conclusions:

I. P < T → False (as P > Z > M > N < T gives P > N and N < T → clear relationship between P and T cannot be determined).

II. N < Z → True (as P > Z > M > N gives N < Z).

Hence, the correct answer is "Only II is true".

Q7. Answer: (b) 118

The correct answer is 118.

Key Points

• Modern Periodic Table

• Elements in the modern periodic table are arranged in increasing order of their atomic numbers, not atomic masses.

• Elements in the modern periodic table are decorated in increasing order of their atomic numbers, so there is no separate space for isotopes. Hence statements (i), (i) and (ii) are false.

• The Modern Periodic Table is used to predict the properties of elements.

• Elements in the modern periodic table are arranged in 7 periods and 18 groups.

• Horizontal rows are called periods and vertical columns are called groups.

• According to their shared physical and chemical properties, the elements can be grouped into the major categories of metals, metalloids, and nonmetals.

Important Points

• Ununennium also known as eka-francium is the 119^(th) element.

Q8. Answer: (b) Father's father

Preparing the family tree using the following symbols,

We can dram following Family Tree from the information given above:

1) Rubi and Juhi are sisters.

2) Krishna is Juhi's father's father.

3) Arvind is the father of Rohit, who is the only brother of Rubi.

4) Reshma is the mother of Arvind.

Hence, Krishna is "Father's father" of Rohit.

Q9. Answer: (c) C

Six people A, B, C, D, E and F are sitting around a circular table facing the centre.

1) C sits second to the left of B.

2) E is an immediate neighbour of B.

3) F sits third to the left of E.

In case - II C is already sitting third to the left of E so case - II is not possible.

4) D sits second to the left of A.

Thus, "C" sits to the immediate right of A.

Q10. Answer: (b) 1

Given:

$6y^2 - 13y + 6 = 0$

Formula used:

For any quadratic equation $ax^2 + bx + c = 0$

The product of the roots = c/a.

Calculation:

According to the question,

a = 6, b = -13, and c = 6

Now,

The product of the roots = c/a = 6/6 = 1

Therefore The product of the two roots of the equation is 1.

Alternate MethodGiven:

6y2 − 13y + 6 = 0

Concept used:

$ax^2 + bx + c = 0$

a, b, c = Known numbers,

Where a ≠ 0, x = Unknown

Calculation:

6y2 − 13y + 6 = 0

=> 6y2 − 9y - 4y + 6 = 0

=> 3y(2y − 3) - 2(2y - 3) = 0

=> (2y − 3)(3y - 2) = 0

=> y = 3/2 and 2/3

Now, According to the question,

(3/2) × (2/3) = 1

Therefore The product of the two roots of the equation is 1.

Additional InformationFor any quadratic equation $ax^2 + bx + c = 0$,

Sum of the roots = -b/a

Q11. Answer: (a) 4.312/3

Shortcut Trick

Volume of a sphere in terms of Surface Area (SA) and radius (r) is given by: Volume = (SA × r) ÷ 3

First, find radius: r^2 = SA ÷ 4π = 61600 ÷ (4 × 22/7) = 4900 => r = 70 cm.

Volume in cm^3 = (61600 × 70) ÷ 3 = 4312000/3 cm^3.

Convert to m^3 (1 m^3 = 10^6 cm^3): (4312000/3) ÷ 1,000,000 = 4.312/3 m^3.

Therefore The correct answer is 4.312/3 m^3.

Alternate Method

Given:

Surface Area of sphere = 61600 cm^2

Value of π = 22/7

Formula Used:

Surface Area = $4\pi r^2$

Volume = $(4/3)\pi r^3$

Calculations:

=> 4 × (22/7) × r^2 = 61600

=> (88/7) × r^2 = 61600

=> r^2 = (61600 × 7) ÷ 88

=> r^2 = 700 × 7 = 4900

=> r = √4900 = 70 cm

=> Volume (V) = (4/3) × (22/7) × 70 × 70 × 70

=> V = (4/3) × 22 × 10 × 70 × 70

=> V = (88 × 49000) ÷ 3 = 4312000/3 cm^3

To convert cm^3 to m^3, divide by 10^6 (since 1 m = 100 cm):

=> V = (4312000/3) ÷ 1,000,000

=> V = 4.312/3 m^3

Therefore The correct answer is 4.312/3 m^3.

Additional Information

Properties of Sphere and Hemisphere

Curved Surface Area of Hemisphere = $2\pi r^2$

Total Surface Area of Hemisphere = $3\pi r^2$

Volume of Hemisphere = $(2/3)\pi r^3$

Unit Conversions

1 m^2 = 10,000 cm^2 | 1 m^3 = 1,000,000 cm^3

Q12. Answer: (a) A, C, P and J

Given:

3 badminton players in each stream Commerce, Science and Arts.

Commerce: A, B and C

Science: P, Q and R

Arts: J, K and L

A team of 4 badminton players are to be sent for a tournament with following conditions:

(i) There must be at least one student from each stream.

Commerce	Science	Art
A / B / C	P / Q / R	J / K / L

(ii) P will not go with Q or R.

Commerce	Science	Art

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A / B / C	P or (Q / R)	J / K / L

(iii) A and C will always go together.

Commerce	Science	Art
B / (A + C)	P or (Q / R)	J / K / L

(iv) K and L will always go together.

Commerce	Science	Art
B or (A + C)	P or (Q / R)	J or (K + L)

Now check all the options:

1) A, C, P, and J → True (All conditions are fulfilled)

2) A, Q, R, and J → False (A and C will always go together)

3) B, Q, J, and K → False (K and L will always go together)

4) B, P, R, and J → False (P will not go with Q or R)

Hence, “Option (1)” is the correct answer.

Q13. Answer: (a) Egypt

The correct answer is Egypt.

Key Points

• The Valley of the Kings is located in Egypt and it is one of the most important archaeological sites in the world.

• A whole cemetery exclusively for pharaohs is present at the site. (pharaohs - A word used for the monarchs of ancient Egypt from the First Dynasty until the annexation of Egypt by the Roman Empire in 30 BCE)

• During Egypt's New Kingdom (1539-1075 B.C.), the valley became a royal burial ground for pharaohs such as Tutankhamun, Seti I, and Ramses II, as well as queens, and high priests, and other elites of the 18th, 19th, and 20th dynasties.

• Located at the foot of the Al-Qurn with its characteristic pyramid-shaped top, it is on the western bank of the Nile, at the height of Luxor.

Important Points

• All the tombs in the Valley of the Kings are numbered according to the order in which they were discovered.

• The last one was Tutankhamen’s, which makes the number 62.

• Egyptologists know them by their number and an abbreviation in front, the letters VK, which stands for “King Valley“.

• The largest and most complex tomb in the Valley of the Kings (number 5) was apparently built to contain the burial chambers of many of the sons of Ramses II (reigned 1279–13), the greatest king of the 19th dynasty.

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Q14. Answer: (a) Two

Given:

PLAN FORE RAMP RANG SAND

The fourth letter is changed to the next letter in the English alphabetical order:

PLAN → “N” is replaced with the next alphabet “O” → PL*AO* - 2 vowels A, O

FORE → “M” is replaced with the next alphabet “N” → F*O*RF

RAMP → “P” is replaced with the next alphabet “Q” → R*A*MQ

RANG → “G” is replaced with the next alphabet “H” → R*A*NH

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SAND → “D” is replaced with the next alphabet “E” → S*A*N*E* - 2 vowels A, E

Hence, “Two” letter clusters thus formed will have two vowels.

Q15. Answer: (b) 4 and 5

According to the BODMAS rule:

Option 1 : 5 and 3

Given:

$6 \times 4 - 5 + 9 \div 3 = Y$

After interchange the signs;

• $6 \times 4 - 3 + 9 \div 5 = Y$

• By BODMAS rule

• $6 \times 4 - 3 + 1.8 = Y$

• $24 - 3 + 1.8 = Y$

• $25.8 - 3 = Y$

• $22.8 = Y \neq 29$

Option 2 : 4 and 5

Given:

$6 \times 4 - 5 + 9 \div 3 = Y$

After interchange the signs;

• $6 \times 5 - 4 + 9 \div 3 = Y$

• By BODMAS rule

• $6 \times 5 - 4 + 3 = Y$

• $30 - 4 + 3 = Y$

• $33 - 4 = Y$

• $29 = Y = 29$

Option 3: 6 and 9

Given:

$6 \times 4 - 5 + 9 \div 3 = Y$

After interchange the signs;

• $9 \times 4 - 5 + 6 \div 3 = Y$

• By BODMAS rule

• $9 \times 4 - 5 + 2 = Y$

• $36 - 5 + 2 = Y$

• $38 - 5 = Y$

• $33 = Y \neq 29$

Option 4: 9 and 3

Given:

$6 \times 4 - 5 + 9 \div 3 = Y$

After interchange the signs;

• $6 \times 4 - 5 + 3 \div 9 = Y$

• By BODMAS rule

• $6 \times 4 - 5 + 0.34 = Y$

• $24 - 5 + 0.34 = Y$

• $24.34 - 5 = Y$

• $19.34 = Y \neq 29$

Hence, the answer is “4 and 5”.

Q16. Answer: (d) 1/6

Given:

$\sqrt{3} \tan 2\theta - 3 = 0$

Concept used:

Calculation:

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√3 tan2θ − 3 = 0

=> √3 tan2θ = 3

=> tan2θ = 3/√3

=> tan2θ = √3

=> tan2θ = tan60°

So, θ = 30°

Now,

tanθsecθ − sinθ = (1/√3) × (2/√3) - (1/2)

=> (2/3) - (1/2)

=> [(4 - 3)/6]

=> 1/6

Therefore Required value of the question is 1/6.

Q17. Answer: (c) 1818

The correct answer is 1818.

Key Points

• The Bengal Regulation III of 1818 also known as the Bengal State Prisoners Regulation, III of 1818, was a law for preventive detention enacted by the East India Company in the Presidency of Bengal in 1818.

• It empowered the British administration to detain an individual indefinitely, on the basis of suspicion of criminal intent, and without having to commit the detainee to trial.

• Similar laws were also enacted in the Presidencies of Madras and Bombay.

• The act, along with a similar law enacted in 1915 was put to significant implementation during World War I in British India and remained enforced until at least 1927.

Q18. Answer: (b) 7/2

Given:

9/15 × 45/81 ×{49/6 ×(16/7−2)} × 24/5 ÷ 16/15

Concept used:

Calculation:

9/15 × 45/81 ×{49/6 ×(16/7−2)} × 24/5 ÷ 16/15

=> 9/15 × 45/81 ×{49/6 ×((16 - 14)/7)} × 24/5 ÷ 16/15

=> 9/15 × 45/81 ×{49/6 ×2/7} × 24/5 ÷ 16/15

=> 9/15 × 45/81 ×7/3 × 24/5 ÷ 16/15

=> 9/15 × 45/81 ×7/3 × 24/5 × 15/16

=> 9/15 × 45/81 ×7/3 × 9/2

=> 9/15 × 45/81 ×21/2

=> 1/3 ×21/2

=> 7/2

Therefore Required answer is 7/2.

Q19. Answer: (b) Asphalt

The correct answer is Asphalt.

Key Points

• Asphalt concrete is one of the most common types of pavement surface materials used in the world. It is a porous material made at a very high temperature of about 180°C that consists of a mixture of asphalt binder (bitumen), aggregate particles, and air voids. After some years of usage, the stiffness of asphalt concrete increases, and its relaxation capacity decreases. The binder becomes more brittle, then micro-cracks develop in it and cracking of the interface between aggregates and binder occurs.

Additional Information

• Granite:

• Granite is unstratified rock, plutonic igneous rock, silicious rock

• Granite is hard, the coarse-grained rock of crystalline structure.

• It is a type of igneous rock (plutonic rock).

• Schist is a type of Metamorphic rock.

• Basalt rock is an example of Extrusive igneous rock.

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Q20. Answer: (c) Uttar Pradesh

The correct answer is Uttar Pradesh.

Key Points

• When Alha was born, the earth sank two and a half hands popular folk singing style of Bundelkhand.

• A form of folk song and music prevalent in North India, which is capable of communicating heroic rasa to the listeners.

• This style of folk music is popularly known as 'alha'.

• Alha is an important verse poem of Bundeli and Awadhi, composed by the great poet Jagnik of the Veergatha period and based on the Parmal Raso.

• This poem is believed to have been composed in about 1250 AD.

• In this, there is a saga of the heroic Alha of Mahoba and the bravery of Udal.

• This is the most popular heroic story of Awadh in Uttar Pradesh and Bundelkhand in Madhya Pradesh.

• From the last phase of the Pavas season to the whole of autumn, there is alha-singing in these two regions either individually or at the group level

• There are many versions of Ala, in which some 52 and 56 battles are described.

• There are many methods of singing this folk epic.

• The popularity of Jagnik's folk poem "Alh-Khand" is nationwide.

Q21. Answer: (a) Dr Shakuntala Haraksingh Thilsted

The correct answer is Dr Shakuntala Haraksingh Thilsted.

Key Points

• Dr. Shakuntala Haraksingh Thilsted, a global nutrition expert of Indian descent, has won the prestigious 2021 World Food Prize.

• She was awarded the prize for her achievements in pioneering fish-based food systems to improve nutrition, health and livelihoods for millions around the world.

• The World Food Prize was created by Nobel Peace Prize laureate Norman Borlaug in 1986.

Q22. Answer: (a) 51/4

Given:

The difference between the outer circumference and the inner circumference of the racing track is 33 m

Concept used:

Circumference of a circle = 2πr

Here r = radius

Calculation:

According to the question,

Let the radius of the outer circle be R and the inner circle be r

Now,

$2\pi R - 2\pi r = 33$

$\Rightarrow 2\pi(R - r) = 33$

$\Rightarrow (R - r) = 33 \times (1/2\pi)$

$\Rightarrow (R - r) = 33 \times (7/44)$

$\Rightarrow (R - r) = 21/4 = 51/4$

So, width of the track = 51/4 m

Therefore The width of the track (in m) is 51/4.

Q23. Answer: (a) 13 cm

Given:

Two chords AB and CD of a circle intersect at a point F outside the circle.

AF = 12 cm

BF = 4 cm

CF = 16 cm

Concept used:

If two chords AB and CD of a circle are cut at a point F outside the circle then,

AF × BF = CF × DF

Calculation:

Let DF be a cm

So, according to the concept,

AF × BF = CF × DF

=> 12 × 4 = 16 × a

=> 48 = 16a

=> a = 48/16

=> a = 3

So, DF = 3

Now,

CD = CF - DF

=> CD = 16 - 3

=> CD = 13 cm

Therefore The length of CD is 13 cm.

Q24. Answer: (a) 34560

Concept used:

Divisibility rule of 3 = Sum of the digits must be divisible by 3

Divisibility rule of 10 = Last two digits must be divisible by 10

Calculation:

According to the concept,

The number should be divisible by both 3 and 10

Now, from the options, all the numbers are divisible by 10 as their last two digits are divisible by 10

Now,

Option 1:

3 + 4 + 5 + 6 + 0 = 18 which is divisible by 3

Option 2:

4 + 5 + 6 + 7 + 0 = 22 which is not divisible by 3

Option 3:

2 + 3 + 4 + 5 + 0 = 14 which is not divisible by 3

Option 4:

1 + 2 + 3 + 4 + 0 = 10 which is not divisible by 3

Therefore Required answer is Option 1.

Q25. Answer: (b) housing and toilet facilities to slum dwellers living below poverty line

The correct answer is housing and toilet facilities to slum dwellers living below poverty line.

Key Points

• Valmiki Ambedkar Awas Yojana (VAMBAY) was launched by the Prime Minister on December 2, 2001.

• With a view to ameliorating the conditions of the urban slum dwellers living below poverty line by providing them with dwelling units and the facility of community toilets.

• The cost of the scheme is shared between Centre and the States on 50:50 basis.

• So far a sum of Rs. 590.00 crore has been allocated and 2,13,066 Dwelling Units as well as 28,753 Toilet Seats have been sanctioned.

Additional Information Some other same kind of schemes:

• Night Shelter for Urban Shelter less

• Earlier known as ‘Shelter and sanitation facilities for the footpath dwellers in urban areas’ the scheme was comprehensively reviews and modified in 2001-02. As on October, 2003, HUDCO has sanctioned 115 night shelters/pay and use toilets. On completion, it would provide 16,959 beds, 18,495 WCs, 2,147 baths and 1,928 urinals.

• National Slum Development Programme

• It provides additional Central assistance to the States for the development of urban slums. Upto October, 2003, a total amount of Rs. 2,238.51 crore has been released to the States/UTs. Out of this 1,556.03 crore has been spent and 3.49 crore slum dwellers have been benefited.

• AUWSP

• Accelerated Urban Water Supply Programme (AUWSP) aims at solving the drinking water problem in towns having population

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less than 20 thousand as per 1991 census. The scheme is funded by Centre and State Governments in the ratio of 50:50. Out of 2,151 eligible towns under AUWSP, 929 towns have been covered from 1993-94 to October, 2003. Out of this, 599 towns have been covered from October, 1999 to October, 2003 and a Central assistance of Rs. 423.56 crore has been provided.

Q26. Answer: (b) 27000

Given:

The number should be divisible by 72, 108, and 300

Concept used:

For this type of question, we use the LCM method to find the required number

Calculation:

$72 = 2^3 \times 3^2$

$108 = 2^2 \times 3^3$

$300 = 2^2 \times 3 \times 5^2$

$LCM = 2^3 \times 3^3 \times 5^2$

=> 5400

Now the number should be a cubic number and multiple of 5400

So,

$5400 \times 2 = 10800$ which is not a cubic number

$5400 \times 3 = 16200$ which is not a cubic number

$5400 \times 5 = 27000$ which is a cubic number and the smallest

Therefore The smallest cubic number, divisible by 72,108 and 300 is 27000.

Q27. Answer: (a) 3 books

The correct answer is 3 books.

Key Points

• Beginning in 1589, Abu'l Fazl worked on the 'Akbar Nama' for thirteen years.

• The Akbar Nama is divided into three books:

• The first book dealt with Akbar's ancestors.

• The second recorded the events of Akbar's reign.

• The third is the Ain-i Akbari.

Additional Information

• It deals with Akbar's administration, household, army, the revenues and geography of his empire.

• It provides rich details about the traditions and culture of the people living in India.

• It also got statistical details about crops, yields, prices, wages, and revenues.

• In the early twentieth century, the Akbar Nama was translated into English by Henry Beveridge.

Q28. Answer: (a) Pulicat Lake

The correct answer is Pulicat Lake.

Key Points

• Pulicat Lake, saltwater lagoon on the Coromandel Coast of Andhra Pradesh state, southern India.

• It extends from the extreme southeastern portion of Andhra Pradesh into the adjacent portion of Tamil Nadu state and has a length of about 30 miles (50 km) and a width of 3 to 10 miles (5 to 16 km).

• The lake is located on the swampy, sandy Andhra plains, and the surrounding area is sparsely settled.

• Towns along the lake include Dugarajupatnam and Pulicat.

• The lake yields salt and prawns.

Additional Information

Q29. Answer: (b) 40.56

Given:

The length of each edge of a cube is 2.6 cm

Concept used:

The total surface area of the cube = $6a^2$

a = length of a side or edge of a cube

Calculation:

The total surface area of the cube = 6×2.6^2

=> 6×6.76

=> 40.56

So, the total surface area of the cube is 40.56 cm^2

Therefore The total surface area (in cm2) of the cube is 40.56.

Q30. Answer: (b) 360 km

GIVEN :

Total Distance to be covered = 1200 kms.

Distance travelled on foot = 25%

Distance travelled by bus = 30%

Distance travelled by train = 15%

CONCEPT :

Remaining Distance travelled by airplane = Total Distance - (Distance travelled on foot + Distance travelled by bus + Distance travelled by train)

CALCULATION :

Let the Total distance be 100%.

According to question,

100% = 1200 Kms

Remaining Distance travelled by airplane = Total Distance - (Distance travelled on foot + Distance travelled by bus + Distance travelled by train)

=> 100% - (25% + 30% + 15%)

=> 100% - 70%

=> 30%

Remaining Distance = 30%

Now,

100% = 1200 Kms

Therefore 30% = 1200 × (30/100) = 360

=> Remaining Distance = 360 Kms

Therefore The distance travelled by Ravi by an Airplane is 360 Km.

Q31. Answer: (b) President

The correct answer is President.

Key Points

• President

• Article 52: There shall be a President of India.

• He is the constitutional head of the executive of India.

• The term of the office of the President is 5 years.

• He is the first citizen of India.

• He is an integral part of the Indian Parliament.

• He can submit his resignation to the Vice President of India.

• He is the supreme commander of the Indian Armed Forces

• First President of India: Dr. Rajendra Prasad

• Current President: Droupadi Murmu (15th)

Additional Information

• Prime Minister

• Article 75: There shall be the Prime Minister appointed by the President.

• Article 74: There shall be the Council of Ministers headed by the Prime Minister and give advice to the President.

• The Prime Minister holds the office as long as he/she enjoys the support of the majority in Lok Sabha.

• The Prime Minister can be a member of any of the houses of the Parliament.

• The Prime Minister submits his resignation to the President.

• Vice President

• Article 63: There shall be the vice-president of India.

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• He/She is the ex-officio chairman of Rajya Sabha.
• The term of the office of Vice-President is 5 years.
• If any vacancy occurs in the office of the President, he/she will act as the president of India.
• He is not a member of any house of the Parliament.
• First Vice-President: Dr. Sarvepalli Radhakrishnan
• Current Vice-President: C. P. Radhakrishnan
• Chief of Defense Staff
• The Chief of Defense Staff of the Indian Armed Forces(CDS) is the head of the military staff of the Indian Armed Forces.
• The Chief of Defense Staff has the authority to create theatre commands as and when needed.
• The task of the Chief of Defense Staff is to better standardize weapons procurement procedures and combining operations of the Army, Air Force, and Navy.
• First Chief Defense Staff: General Bipin Rawat

Q32. Answer: (a) Ginkgo biloba

The correct answer is Ginkgo Biloba.

Key Points

• The gymnosperms (gymnos: naked, Sperma: seeds) are planted in which the ovules are not enclosed by any ovary wall and remain exposed, both before and after fertilization.
• Gymnosperms include medium-sized trees or tall trees and shrubs.
• Gymnosperms are mainly classified into two groups:
• Cycadophyta (Lower gymnosperm)
• Coniferophyta (Higher gymnosperm)
• Examples of gymnosperms are cycas, ginkgo, pinus, etc.

Additional Information

• Ginkgo is a kind of tree that is considered one of the oldest living trees.
• It dates back to 200 million ago.
• Ginkgo is known as a living fossil because its present species have remained unchanged for the past 51 million years.
• This is the feature of a fossil.

Q33. Answer: (a) 73

Given:

$67.96 + 5.12 - 0.89 \div 31.88$

Concept used:

Calculation:

$67.96 + 5.12 - 0.89 \div 31.88$

$\Rightarrow 68 + 5 - 1 \div 32$

$\Rightarrow 68 + 5 - (1/32)$

$\Rightarrow 73 - (1/32)$

$\Rightarrow 73 - 0.3125$

$\Rightarrow 72.96875 \approx 73$

Therefore Required answer is 73.

Q34. Answer: (d) Rs. 12,225

Shortcut Trick

Difference in Amount = Difference in Interest

Extra Interest for 7 years = Rs. 25,917 − Rs. 22,494 = Rs. 3,423

Extra Interest % = 4% × 7 = 28% of Principal

=> 28% of Principal = Rs. 3,423

=> Principal = (3,423 ÷ 28) × 100 = Rs. 12,225

Therefore The correct answer is Rs. 12,225.

Alternate Method

Given: Amount1 = Rs. 22,494, Amount2 = Rs. 25,917, Time (T) = 7 years, Rate difference = 4%.

Formula Used: Simple Interest (SI) = (P × R × T) ÷ 100; Amount = P + SI

=> Difference in Amount = (P × (x + 4) × 7 ÷ 100) − (P × x × 7 ÷ 100)

=> Rs. 25,917 − Rs. 22,494 = (P × 7 ÷ 100) × (x + 4 − x)

=> Rs. 3,423 = (P × 7 × 4) ÷ 100

=> Rs. 3,423 = (P × 28) ÷ 100

=> P = (3,423 × 100) ÷ 28

=> P = 122.25 × 100 = Rs. 12,225

Therefore The correct answer is Rs. 12,225.

Additional Information

Simple Interest Property

Simple interest remains constant every year if the principal and rate are unchanged. SI = (P × R × T) ÷ 100.

Rate Change Impact

If the rate increases by r% for t years, the extra interest earned is (P × r × t) ÷ 100.

Amount Formula

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

Q35. Answer: (a) Mahapurusha Srimanta Sankaradeva

The Correct answer is Mahapurusha Srimanta Sankaradeva.

Key Points

• The Sattriya dance form was introduced in the 15th century A.D by the great Vaishnava saint and reformer of Assam.

• The dance form evolved and expanded as a distinctive style of dance later on.

• Due to its of its religious character and association with the Sattras, this dance style has been aptly named Sattriya.

Additional Information

• About Assam: (as of May 2021)

• Chief Minister - Sri Himanta Biswa Sarma

• Governor - Shri Lakshman Prasad Acharya

• The number of districts - 33.

• Lok Sabha seats - 14.

• Rajya Sabha seats - 7

Q36. Answer: (a) Sharma

Given:

• First row: Mani, Nani, Alex, Puri and Tuli are seated facing south.

• Second row: Sharma, Atkin, Putin, Neha and Priya are seated facing north.

1) Priya sits third to the right of Atkin.

2) Atkin sits at one of the extreme ends.

3) Sharma sits second to the left of Priya.

4) The person facing Sharma sits to the immediate right of Nani.

5) Puri sits second to left of Nani.

6) Mani is not an immediate neighbour of Nani.

7) Only two people sit between Mani and Alex.

8) Neither Nani nor Mani faces Neha.

9) Only Tuli and Putin are left so the final sitting arrangement is:

Hence, "Sharma" is facing Tuli.

Q37. Answer: (c) er

According to the given information

Word	Code
cip	life / is
cin	life / is
er	love

'love' is coded as "er".

Hence, 'er' is the correct answer.

Q38. Answer: (a) Only II is true

Given statements: A > Z ≥ P > M; P < R

Conclusions:

I. A > R → False (as A > Z ≥ P > M; P < R gives A > P and P < R → clear relationship between A and R cannot be determined).

II. M < R → True (as A > Z ≥ P > M; P < R gives M < P and P < R → M < P < M so M < R).

Hence, the correct answer is “Only II is true”.

Q39. Answer: (a) 8th Schedule

The correct answer is 8th Schedule.

Key Points

• Schedule VIII of the Indian constitution has given recognition to 22 languages.

• Initially, there were 14 languages in the eighth schedule of our constitution.

• 21st Constitutional Amendment Act (CAA) 1967 added one language (Sindhi), 71st CAA, 1992 added 3 (Konkani, Manipuri and Nepali).

• 92nd CAA od 2003 added Bodo, Dogri, Maithili, Santhali to the eighth schedule making a total of 22 languages.

Additional Information

• English and Hindi are the languages declared by our constitution for transacting business in the Parliament.

• English and Hindi are the official languages of India.

• There is no national language of India as mentioned by the constitution of India.

• To give constitutional recognition to a language recognition it must be added to the eighth schedule of our constitution by the Constitutional Amendment Act

Q40. Answer: (b) 18 litres

Shortcut Trick

Total volume is 90 litres for both mixtures and total ratio parts are 5 for both (4 + 1 = 5 and 3 + 2 = 5).

Difference in milk ratio parts directly = 4 − 3 = 1 part.

Since 5 parts = 90 litres, 1 part = 90 ÷ 5 = 18 litres.

Thus, the difference in the quantity of milk is 18 litres.

Therefore The correct answer is 18 litres.

Alternate Method

Mixture 1 (90L)

Water: 1 part

Milk: 4 parts (72L)

Mixture 2 (90L)

Water: 2 parts

Milk: 3 parts (54L)

Milk Difference = 72L - 54L = 18L

Given:

Total quantity of Mixture 1 = 90 litres

Ratio of milk to water in Mixture 1 = 4 : 1

Total quantity of Mixture 2 = 90 litres

Ratio of milk to water in Mixture 2 = 3 : 2

Calculations:

=> Total ratio parts in Mixture 1 = 4 + 1 = 5 parts

=> Quantity of milk in Mixture 1 = 90 × (4 ÷ 5) = 72 litres

=> Total ratio parts in Mixture 2 = 3 + 2 = 5 parts

=> Quantity of milk in Mixture 2 = 90 × (3 ÷ 5) = 54 litres

=> Positive difference between the quantities of milk = 72 − 54 = 18 litres

Therefore The correct answer is 18 litres.

Additional Information

Mixing Multiple Mixtures

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When combining multiple mixtures, it is easiest to find the individual fractional quantities of each component (e.g., milk and water) for each mixture before adding them together to find the final overall ratio.

Rule of Alligation

It helps to find the ratio in which two ingredients at given prices or concentrations must be mixed to produce a mixture of a desired average price or concentration.

Replacement Method

When a certain volume of mixture is repeatedly replaced by a solvent (like water), the remaining amount of the pure element after n replacements is: Final = Initial × (1 − Replacement Volume ÷ Total Volume)^n.

Q41. Answer: (c) 44

Shortcut Trick

Ratio of efficiency between Sudhir and Aarav = 4.5 : 1 → 9 : 2

Total efficiency of both working together = 9 + 2 = 11 units/day

Total Work = Total Efficiency × Time = 11 × 8 = 88 units

Time taken by Aarav alone = Total Work ÷ Aarav's Efficiency = 88 ÷ 2 = 44 days

Therefore The correct answer is 44 days.

Alternate Method

Given:

=> Sudhir's efficiency is 4.5 times that of Aarav.

=> Time taken by both to complete the work = 8 days.

Formula Used:

=> Work = Efficiency × Time

=> Individual Time = Total Work ÷ Individual Efficiency

Person	Days	Total Work	Efficiency
Sudhir	9.77	88	9
Aarav	44	2	

=> Let the efficiency of Aarav be 2 units/day.

=> Then, the efficiency of Sudhir = 4.5 × 2 = 9 units/day.

=> Combined efficiency of Sudhir + Aarav = 9 + 2 = 11 units/day.

=> Total work to be completed = 11 units/day × 8 days = 88 units.

=> Time taken by Aarav alone = 88 units ÷ 2 units/day = 44 days.

Therefore The correct answer is 44 days.

Additional Information

Efficiency-Time Relationship

Efficiency is inversely proportional to time. If person A is n times more efficient than B, A will take 1/n of the time taken by B.

Combined Work Formula

If two people with efficiencies E1 and E2 work together for D days, the total work is (E1 + E2) × D.

Work and Wages

Wages are generally distributed based on the ratio of work done, which is the product of efficiency and the time for which they worked.

Q42. Answer: (c) Nepal

The correct answer is Nepal.

Key Points

• Nepal shares a border with two major countries, India and China.

• The boundary of Nepal is surrounded by India in the east, west, and south.

• On the north, there is China's Tibetan Autonomous Region (TAR).

• Boundaries of Nepal have been shifted time and often in the historical period.

• In 1806, Nepal's territory was elongated from a River on the east to Kangra Fort on the west.

• Similarly, it was extended up to the confluence of Gandak and Ganges rivers to the south during British India. It was called the 'Greater Nepal.'

• In 1809, the border retreated back to Sutlej.

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• After Anglo- Gorkha War, Nepal's boundary was shrunk from Mechi in the east to Mahakali in the west in March 1816.
• India shares a borderline with Nepal of about 1751 Km.
• It does not have any direct access to the sea.

Q43. Answer: (c) 9

Given:
Radius of the sphere = 3 cm
Thickness of the wire = 4 mm
Concept used:
Volume of a sphere = (4/3)πr3
Volume of a cylinder = πr2h
r = radius of the base of cylinder and radius of the sphere
h = length of height of the cylinder
Calculation:
Thickness 4 mm i.e diameter
So, radius = 2 mm
Now,
3 cm = 30 mm
According to the question,
Volume of the sphere = Volume of the wire
$(4/3)\pi \times 30^3 = \pi 2^2 h$
=> 4 × 10 × 900 = 4h
=> 9000 = h
So, length of the wire = 9000 mm
But here we have asked the length of the wire in m
So, length = 9000/1000 = 9 m [Because 1 m = 1000 mm]
Therefore The length of the wire (in m) is 9.

Q44. Answer: (c) Rajnath Singh

The correct answer is Rajnath Singh.
Key Points
• Defence Minister Rajnath Singh has approved the policy on archiving, declassification and compilation/publication of war/operations histories by the Ministry of Defence.
• The policy envisages that each organisation under the Ministry of Defence will transfer the records to the History Division of the Ministry of Defence for proper upkeep, archival and writing of the histories.
• The policy mandates the constitution of a committee headed by the Joint Secretary, MoD and comprising of representatives of the Services, MEA, MHA and other organisations and prominent military historians (if required), for compilation of war/operations histories.

Q45. Answer: (c) Right

The correct answer is Right.
Key Points
• As a default in Microsoft Excel, text typed into a cell is aligned to the left border of the cell while numbers are aligned to the right.
• The default alignment for most types of data is left alignment.
• This helps make the data easily scannable, readable, and comparable.
Additional InformationAlignment of data:
• Align Text Left:
• Horizontally aligns the data along the left edge of the cell.
• Center:
• Centers the data horizontally in the middle of the cell. If you modify the column width, the data remains centered on the new column width.
• Align Text Right:
• Horizontally aligns the data along the right edge of the cell.

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Q46. Answer: (d) Karnataka

The correct answer is Karnataka.

Key Points

• Huli Vesha is a dance form unique to coastal Karnataka.

• Huli Vesha is performed by local youth during the Navratri Festival.

• It is also known as Tiger faced dance.

• Huli Vesha is performed to pay tribute to Goddess Durga, whose official animal is tiger.

Additional Information

State	Dances
Kerala	Ottan Thullal
Odisha	Chaiti Ghoda
Gujarat	Tippani

Q47. Answer: (a) Decomposition reaction

The correct answer is Decomposition reaction.

Key Points

• On heating, ferrous sulphate crystals lose water and anhydrous ferrous sulphate ($FeSO_4$) is formed.

• So their colour changes from light green to white. On further heating, anhydrous ferrous sulphate decomposes to form ferric oxide (Fe_2O_3), sulphur dioxide (SO_2) and sulphur trioxide (SO_3).

• Ferrous sulphate crystals contain water molecules ($FeSO_4.\ 7H_2O$).

• On heating, ferrous sulphate crystals lose water and anhydrous ferrous sulphate ($FeSO_4$) is formed.

• So their colour changes from light green to white.

• On further heating, anhydrous ferrous sulphate decomposes to form ferric oxide (Fe_2O_3), sulphur dioxide (SO_2) and sulphur trioxide (SO_3).

• So, the gas emitted smells like burning sulphur.

• In this reaction, the single reactant $FeSO_4$ decomposes to form three different products.

• So, the reaction is a decomposition reaction.

Q48. Answer: (b) Rs. 1,004.50

Shortcut Trick

For half-yearly compounding, the rate becomes 5% (10% ÷ 2) and periods become 2 (1 year × 2).

Effective interest rate for 2 periods at 5% = 5 + 5 + (5 × 5)/100 = 10.25%.

Total interest = 10.25% of Rs. 9,800.

Calculation: 9800 × 0.1025 = 1004.5.

Therefore The correct answer is Rs. 1,004.50.

Alternate Method

Given:

Principal (P) = Rs. 9,800

Annual Rate (R) = 10% per annum

Time (T) = 1 year

Formula Used:

For compounding half-yearly:

New Rate (r) = R/2 | New Time (n) = T × 2

Amount (A) = $P(1 + r/100)^n$

Interest (CI) = A − P

Calculations:

=> r = 10% ÷ 2 = 5%

=> n = 1 × 2 = 2 half-years

=> $A = 9800(1 + 5/100)^2$

=> $A = 9800(1 + 0.05)^2$

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=> A = 9800(1.05)²
=> A = 9800 × 1.1025
=> A = Rs. 10,804.50
=> CI = 10804.50 − 9800
=> CI = Rs. 1,004.50
Therefore The correct answer is Rs. 1,004.50.
Additional Information
Compounding Frequency
For half-yearly, rate is halved (R/2) and time is doubled (2T). For quarterly, rate is R/4 and time is 4T.
Effective Rate Formula
Successive percentage change formula: a + b + (ab/100) helps find net interest rate for multiple periods.
Compound vs Simple Interest
In the first period (if compounding frequency matches time), CI equals SI. From the second period, CI is always greater than SI.

Q49. Answer: (b) 17

Shortcut Trick
Arrange the data in ascending order to find the middle term.
The Mode is the most frequently occurring value, which is 31.
The Median for 17 terms is the 9^(th) term, which is 14.
Required Difference = 31 − 14 = 17.
Therefore The correct answer is 17.
Alternate Method
Given: Data set = {2.1, 5, 6, 7, 8, 9.3, 11, 15, 17, 19.21, 27, 31, 31, 33, 16.5, 14, 10}
Formula Used:
1. Mode = Value with the highest frequency.
2. Median (if n is odd) = ((n + 1) ÷ 2)^(th) term of the sorted data.
Calculations:
=> Arrange in ascending order: 2.1, 5, 6, 7, 8, 9.3, 10, 11, 14, 15, 16.5, 17, 19.21, 27, 31, 31, 33
=> Total number of observations (n) = 17
=> Median = ((17 + 1) ÷ 2)^(th) term = 9^(th) term
=> 9^(th) term = 14
=> In the data set, 31 occurs twice, which is the highest frequency.
=> Mode = 31
=> Required Difference = |Median − Mode|
=> Difference = 31 − 14 = 17
Therefore The correct answer is 17.
Additional Information
Empirical Relationship
For a moderately skewed distribution, the relationship is: Mode = 3 × Median − 2 × Mean.
Median for Even observations
If n is even, Median = Average of (n ÷ 2)^(th) and ((n ÷ 2) + 1)^(th) terms.
Range of Data
Range = Maximum Value − Minimum Value. For this set, Range = 33 − 2.1 = 30.9.

Q50. Answer: (d) Monaco

The correct answer is Monaco.
• Among the given options Monaco had the highest population density in 2019.
Key Points

Country	Population density (persons per square km) in 2019
Monaco	26152.3
Hong Kong	7082.1

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Netherlands	507.0
Sweden	24.5

Important Points

• China, with a population of 1.44 billion, is the most populous country worldwide.

• In 2019, over 60% of its population resided in urban centres, a trend that has seen the portion of city dwellers double over the last 25 years.

• For context, 83% of the U.S. population lives in cities, while just 35% of India's population dwells in urban areas.

• Together, China and India's populations make up over 36% of the global total.

Additional Information

• Most Populous Countries

China	**19.63%**
India	17.7%
United States	4.53%
Indonesia	3.39%
Brazil	2.83%
Pakistan	2.47%
Bangladesh	2.39%
Nigeria	2.28%
Russia	2.09%
Japan	1.88%

• Least Populous Countries

Rank	Country/Territory	Population
1	Vatican City	826
2	Nauru	9322
3	Tuvalu	10544
4	Palau	20,000
5	San Marino	31817
6	Monaco	30539
7	Liechtenstein	35236
8	Saint Kitts and Nevis	50314
9	Marshall Islands	67182
10	Dominica	72969

Q51. Answer: (a) CEADAD

Given: A _ _ B D _ C E B _ _ C E B _

By checking options and substituting accordingly.

1) CEADAD → A C E B D - A C E B D - A C E B D

• Here " A C E B D" is repeated.

2) CDADEA → A C D B D - A C E B D - E C E B A

3) CADADE → A C A B D - D C E B A - D C E B E

4) CDAEAD → A C D B D - A C E B E - A C E B D

Hence, 'CEADAD' is the correct answer.

Q52. Answer: (d) Six

Given:

• There are eight persons-Manoj, Nitya, Varun, Pranay, Kali, Reva, Sarayu and Teena.

• All of them are sitting in a straight row and are facing North.

1) Reva is fourth from the extreme right end.

2) Kali is sitting second to the left of Reva.

3) Teena sits to the immediate right of Kali.

4) There are only two persons sitting between Reva and Pranay.

5) Manoj sits at one of the extreme ends of the row.

6) The number of persons sitting between Kali and Manoj is the same as the number of persons sitting between Pranay and Sarayu.

• In case -II only one person is sitting between Kali and Manoj. This is not possible for Pranay and Sarayu. Therefore, case II is eliminated.

7) Sarayu is sitting to the immediate left of Nitya.

8) Varun is not a neighbour of Sarayu.

Sarayu and Nitya are immediate neighbours but there is no place for Nitya in case - III so this case is wrong.

Hence, "six" persons are seated to the left of Nitya

Q53. Answer: (c) Punjab

The correct answer is Punjab.

Key Points

• Punjab, Haryana, Chandigarh, Delhi and Puducherry have no population of Scheduled tribes as per Census 2011.

• States and Union territories have a minimum ratio of Scheduled tribes, as per Census-2011:

• Uttar Pradesh (0.6%)

• Tamil Nadu (1.1%)

• Bihar (1.3%)

• Kerala (1.5%)

• Uttarakhand (2.9%)

• As per the census 2011, Mizoram has the highest proportion of Scheduled Tribes in its population.

• The Indian Census is the most credible source of information on Demography (Population characteristics), Economic Activity, Literacy and Education, Housing Household Amenities, Urbanisation, Fertility and Mortality, etc.

• Census 2011 was the 15th National Census of the Country.

• The slogan of census 2011 was ‘Our Census, Our future’.

Additional Information

State with the highest proportion of Scheduled Tribes	**Mizoram (94.5 %)**
State with the lowest proportion of Scheduled Tribes	Goa (0.04 %)
UT with the highest proportion of Scheduled Tribes	Lakshadweep (94.5 %)
UT with the lowest proportion of Scheduled Tribes	A & N Islands (8.3 %)
District with the highest proportion of Scheduled Tribes	Sarchhip, Mizoram (98.1%)
District with the lowest proportion of Scheduled Tribes	Hathras, Uttar Pradesh (0.01%)

Q54. Answer: (c) Eight

The correct answer is Eight.

Key Points

• India won eight gold, five silver, and six bronze medals for a total haul of 19 in the junior category.

• The prize money for gold, silver, and bronze medallists were $4,000, $2,000, and $1,000, respectively, in the junior category.

• The youth boxers added a further six gold, nine silver, and five bronze medals.

• This is the first time that the continental event is jointly hosting both age groups.

Important Points

• ASBC stands for Asian Boxing Confederation that conducts Boxing championships at various levels.

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• 2022 ASBC Asian Youth and Junior Boxing Championships were held in Amman, Jordan.

Q55. Answer: (b) 20%

Given:

A can complete 12% of the work in 15% of the allotted time

Calculation:

Let the total time taken by them be 100 minutes

So, 15% of 100 minutes = 15 minutes

Now,

12% of work is completed in 15 minutes by A

4% of work is completed in 5 minutes by A

80% of work is completed in 100 minutes by A

If A can complete 80% in 100 minutes then, B will complete remaining portion i.e (100 - 80) = 20%

Therefore 20% of the work was done by B.

Q56. Answer: (a) 25

The correct answer is 25.

Key Points

• The High Court is the supreme judicial body in a state.

• Every High Court comprises of a Chief Justice and other judges appointed by President.

• As of December 2021, there are 25 High Courts in India.

• The Calcutta High Court is one of the three High Courts in India established at the Presidency Towns by Letters patent granted by Her Majesty Queen Victoria, bearing the date June 26, 1862.

• Calcutta High Court is the oldest High Court in India.

Additional Information

• High Court

• High Court is the highest judiciary court in an Indian State.

• The Chief Justice of the High Court is appointed by the President after the consultation with the Chief Justice of India and the Governor of the State concerned.

• Judges of the High Courts are appointed by the President.

• The oath of affirmation to the judges of the High Court is administered by the Governor of the State.

• A judge of the High court can resign his office by writing a letter to the President.

• The judges of the High court shall hold the office till he attained the age of 62 years.

• The Parliament can establish a common High Court for two or more states and Union Territories.

• Indian High Court Act was passed in 1861 during the period of Lord Canning.

• The institution of the High Court originated in India in 1862 when the three High Courts at Calcutta, Bombay, and Madras.

• Delhi is the only union Territory having a High Court.

• Calcutta High Court is the oldest High Court in India.

• Article 214 - High Court for each state.

• Article 226 - Empowers the high court to issue writs.

• The first Indian to become the Chief Justice of the High court - was P. B. Chakravarthi (Calcutta High Court).

• The first Indian to become the judge of the High court - was Sambhunath Pandit (Calcutta High Court).

• The first woman Chief Justice of the High court - was Leila Seth (Himachal Pradesh).

• The first woman to become a judge of the High court - was Anna Chandi (Kerala).

Q57. Answer: (a) per capita income

The correct answer is per capita income.

Key Points

• When we divide NNP by the total population of a nation we get the per capita income.

• Per Capita Income= NNP/ Total Population*.*

Important Points

• Net national product (NNP) is the gross national product (GNP), the total value of finished goods and services produced by a country's citizens overseas and domestically, minus depreciation.

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• NNP is often examined on an annual basis as a way to measure a nation's success in continuing minimum production standards.

• It can be a useful method to keep track of an economy as it takes into account all its citizens, regardless of where they make their money, and acknowledges the fact that capital must be spent to keep production standards high.

• The NNP is expressed in the currency of the nation it represents. That means that in the United States the NNP is expressed in dollars (USD), while for the European Union (EU) member nations the NNP is expressed in euros (EUR).

• The NNP can be extrapolated from the GNP by subtracting the depreciation of any assets. The depreciation figure is determined by assessing the loss of the value of assets attributed to normal use and aging.

• The relationship between a nation's GNP and NNP is similar to the relationship between its gross domestic product (GDP) and net domestic product (NDP).

Q58. Answer: (a) Both conclusions I and II are true

Given statements: K = P < C; P > Q; Q > L

On combining: L < Q < K = P < C

Conclusions:

I. Q < C → True (as L < Q < K = P < C gives Q < C).

II. K > L → True (as L < Q < K = P < C gives K > L).

Hence, the correct answer is “Both conclusions I and II are true”.

Q59. Answer: (c) 46

Given:

The average weight of 14 students of a class is 20 kg.

Concept used:

Average = Sum of elements/No. of elements

Calculation:

Total weight of 14 students = 14 × 20

=> 280 kg

After a student left the class total weight of the class = (20 - 2) × 13

=> 18 × 13 = 234 kg

So, the weight of the 14th student who left the class was = 280 - 234

=> 46 kg

Therefore The weight of the student (in kg) who left the class is 46.

Q60. Answer: (a) Hyderabad

The correct answer is Hyderabad.

Key Points

• Union Minister of State Science and Technology Dr. Jitendra Singh inaugurated India’s first unique Rock Museum in Hyderabad.

• The Open Rock Museum has been set up with the aim to educate people about several lesser-known facts.

• It displays around 35 different types of rocks from different parts of India with ages ranging from 3.3 billion yrs to around 55 million years of the Earth’s history.

Q61. Answer: (a) Thane

The correct answer is Thane.

Key Points

• India’s first rail run on Mumbai – Thane route in 1853.

• It was the first passenger train to run in India.

• It had three locomotives – Sahib, Sultan, and Sindh, and 14 carriages.

• A distance of 34 km was covered by the train.

• Based on the success of this rail, the launch of Eastern railway in 1854 and South railway in 1856.

Q62. Answer: (a) Mining

The correct answer is Mining.

Key Points

• The primary sector of the economy includes any industry involved in the extraction and production of raw materials, such as farming, logging, hunting, fishing, and mining.

• When we produce a good by exploiting natural resources, it is an activity of the primary sector.

• Since most of the natural products we get are from agriculture, like dairy, fishing, forestry, this sector is also called agriculture and related sector.

• Out of these, forestry, poultry farming, and animal husbandry come under the primary sector.

• The primary sector tends to make up a larger portion of the economy in developing countries than it does in developed countries.

Additional Information

• The main sectors of the economy are:

• Primary sector – extraction of raw materials – mining, fishing, and agriculture.

• Secondary/manufacturing sector – concerned with producing finished goods, e.g. Construction sector, manufacturing, and utilities, e.g. electricity.

• Quarrying and manufacturing are included in the secondary sector.

• Service / 'tertiary' sector – concerned with offering intangible goods and services to consumers. This includes retail, tourism, banking, entertainment, and I.T. services.

• Trade, transport, communication, banking, education, health, tourism, services, insurance, etc. are included in the tertiary sector.

• Quaternary sector (knowledge economy, education, research, and development).

Q63. Answer: (d) Only conclusion II follows

Venn diagram:

Conclusions:

I. All machines are men → False (Because all men are robots and robots are machines so all men are also machines but not all machines are men)

II. Some robots are men → True (Because all men are robots so some robots are also men)

Hence, "Only conclusion II follows".

Q64. Answer: (a) High-Yielding Varieties Programme

The correct answer is High-Yielding Varieties Programme.

Key Points

• HIGH YIELDING VARIETY PROGRAMME (HYVP):

• HIGH YIELDING VARIETY PROGRAMME (HYVP) was launched in 1966, which helped the country in attaining self-sufficiency in food.

• It launched in an objective to attain self-sufficiency in food by 1970-71.

• The HYVP was the responsibility of the state government for its implementation from its existing resources under the guidance and supervision of the central government.

• The aim of the programme was to increase the productivity of food grains by adopting the latest varieties of inputs of crops.

• This programme in the 4th five-year plan was a major breakthrough and a turning point in the history of agriculture development in India.

Q65. Answer: (d) 1547

Shortcut Trick

Product of the numbers (xy) = [(Sum)² − (Sum of squares)] ÷ 2

xy = (17² − 157) ÷ 2 = (289 − 157) ÷ 2 = 66.

Find two numbers whose product is 66 and sum is 17: the numbers are 11 and 6.

Sum of cubes = $11^3 + 6^3 = 1331 + 216 = 1547$.

Therefore The correct answer is 1547.

Alternate Method

Given:

Sum of two numbers (x + y) = 17

Sum of their squares ($x^2 + y^2$) = 157

Formula Used:

1) $(x + y)^2 = x^2 + y^2 + 2xy$

2) $x^3 + y^3 = (x + y)(x^2 + y^2 − xy)$

Sum (x+y) = 17

$x^2 + y^2 = 157$

xy = 66

Required: $x^3 + y^3 = (x + y)(x^2 + y^2 − xy)$

17 × (157 − 66) = 17 × 91

Final Value = 1547

Calculations:

=> $(x + y)^2 = x^2 + y^2 + 2xy$

=> $17^2 = 157 + 2xy$

=> 289 − 157 = 2xy

=> 132 = 2xy

=> xy = 66

=> $x^3 + y^3 = (x + y)(x^2 + y^2 − xy)$

=> $x^3 + y^3 = 17 × (157 − 66)$

=> $x^3 + y^3 = 17 × 91$

=> $x^3 + y^3 = 1547$

Therefore The correct answer is 1547.

Additional Information

Sum of Cubes Identity

$x^3 + y^3 = (x + y)^3 − 3xy(x + y)$ is another way to calculate the sum of cubes if the product and sum are known.

Difference of Cubes Identity

$x^3 − y^3 = (x − y)(x^2 + xy + y^2) = (x − y)^3 + 3xy(x − y)$.

Relationship between Squares and Product

$(x + y)^2 − (x − y)^2 = 4xy$. This connects the sum, difference, and product of two numbers.

Q66. Answer: (b) 87.6 m

Given:

The area of a rectangle is 453.6 m2

Length = 27 m

Concept used:

Area of a rectangle = (l × b)

Perimeter of a rectangle = 2(l + b)

Here l = length, b = breadth

Calculation:

Let breadth be b

According to the question,

(27 × b) = 453.6

=> 27b = 453.6

=> b = 453.6/27

=> b = 16.8

So, breadth = 16.8 m

Now,

Perimeter = 2(27 + 16.8) m

=> 2 × 43.8 m

=> 87.6 m

Therefore The perimeter of the rectangle is 87.6 m.

Q67. Answer: (d) 4 km towards East

Drawing the diagram according to the given information,

1. Ramdin started from his office and walked 15 km in the south direction and reached the bus stop.
2. Then turned to his left and walked 8 km straight on the road.
3. Thne turned to his left, walked 15 km and reached the Central Library.
4. After this, he turned to his left again and walked 4 km to reach his hostel.

Hence, the hostel is "4 km towards East" with respect to his office.

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Q68. Answer: (b) 0.0255

Given:

Given set of numbers:

0.82, 0.802, 0.85, 0.085

0.3, 0.03, 0.203, 2.03

Calculation:

Hence,

The greatest among the numbers 0.82, 0.802, 0.85, 0.085 = 0.85

The smallest among the numbers 0.3, 0.03, 0.203, 2.03 = 0.03

Thus, their product = 0.85 × 0.03 = 0.0255

Therefore The product of the greatest among the numbers 0.82, 0.802, 0.85, 0.085 with the smallest among the numbers 0.3, 0.03, 0.203, 2.03 is 0.0255.

Q69. Answer: (d) Ropar

The correct answer is Ropar.

Key Points

• Harappan Civilization is also referred to as the “Indus Valley Civilization”.

• It was part of the Bronze age (and the beginning of the Iron age too) and flourished between 3300–1300 BCE.

• It is one of the largest Ancient Civilizations known today.

• It was widespread as it covered parts of India, Pakistan and Afghanistan

• Harappa and Mohenjo Daro, the two major sites of this civilization – are among the earliest and finest examples of urban civic planning.

• They had a well-planned network of roads, houses and drainage systems indicating the planning and engineering skills that developed during those times.

• The civilization was discovered in 1921 at Harappa in the Punjab region and Mohenjodaro was discovered in 1922, near the Indus River in the Sindh (Sind) region and both sites are located in present-day Pakistan.

Important Points

• Ropar is an Indus Valley settlement located on the banks of the Sutlej River.

• Recent excavations at Ropar(Rupnagar) have demonstrated that this town was the centre of a well-developed Indus Valley Civilization.

• Ropar is the location of the earliest Indus Valley excavations in independent India and is located in Punjab.

• Ropar:

• Y D. Sharma discovered Ropar in 1953.

• A new form of ceramics and ornaments has been discovered.

• Characteristic Harappan pottery cert blades, beads, faience decorations, brus Celts, terracotta calies, and an engraved seal with typical information pictographs were discovered.

• The region is a shadily inhabited area known for being one of the key Indus Valley Civilization excavation sites.

• The Ropar excavations have provided a thorough understanding of the Indus Valley civilisation and the Harappa Culture.

• Archaeologists estimate that Harappans lived at Ropar until around 2,000 BC.

• We discovered faience and shell bangles, agate beads, copper reads, and other items in the graves.

• There is an indication of burying the dog beneath the human grave.

• A copper axe was discovered.

• Stones and mud were used to build dwellings.

• Banawali is an Indus Valley Civilization era archaeological site in Fatehabad district, Haryana, India, northeast of Kalibangan and Fatehabad.

• Banawali, formerly known as Vanavali, is located on the left bank of the dried-up Saraswati River.

Q70. Answer: (d) 8%

Shortcut Trick

Simple interest remains constant for every year.

SI for 5 years = A10 − A5 = 12600 − 9800 = Rs. 2800

Principal (P) = A5 − SI for 5 years = 9800 − 2800 = Rs. 7000

SI for 1 year = 2800 ÷ 5 = Rs. 560

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Rate % = (SI for 1 year ÷ P) × 100 = (560 ÷ 7000) × 100 = 8%

Therefore The correct answer is 8%.

Alternate Method

Given:

Amount after 5 years (A5) = Rs. 9800

Amount after 10 years (A10) = Rs. 12600

Formula Used:

Amount = Principal + Simple Interest

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

0 Years

5 Years

10 Years

P

Rs. 9800

Rs. 12600

• Rs. 2800 (SI for 5 yrs)

• Rs. 2800 (SI for 5 yrs)

P = Rs. 9800 − Rs. 2800 = Rs. 7000

Calculations:

=> Simple Interest for 5 years = Amount after 10 years − Amount after 5 years

=> SI for 5 years = 12600 − 9800 = Rs. 2800

=> Simple Interest for 1 year = 2800 ÷ 5 = Rs. 560

=> Principal (P) = Amount after 5 years − SI for 5 years

=> P = 9800 − 2800 = Rs. 7000

Now, substitute the values in the SI formula for 1 year:

=> 560 = (7000 × R × 1) ÷ 100

=> 560 = 70 × R

=> R = 560 ÷ 70 = 8

Therefore The correct answer is 8%.

Additional Information

Simple Interest vs Compound Interest

Simple Interest is calculated only on the principal amount, hence it remains constant every year. Compound Interest is calculated on the principal plus the accumulated interest of previous periods.

Difference Between CI and SI for 2 Years

The difference between compound interest and simple interest for exactly 2 years at rate R% is given by the formula: D = P × (R ÷ 100)².

Amount Formula for SI

The total amount A accumulated after time T at rate R is calculated directly as: A = P(1 + (R × T) ÷ 100).

Q71. Answer: (d) 15 : 208

The logic followed here is:

(1^(st) number) × (1^(st) number - 1) = 2^(nd) number.

Now, follow the logic:

Option (1): 21 : 420

=> 21 × (21 - 1) = 21 × 20 = 420 = 1st number.

Option (2): 25 : 600

=> 25 × (25 - 1) = 25 × 24 = 600 = 1st number.

Option (3): 17 : 272

=> 17 × (17 - 1) = 17 × 16 = 272 = 1st number.

Option (4): 15 : 208

=> 15 × (15 - 1) = 15 × 14 = 210 ≠ 208

This option does not follow the pattern.

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Hence, the pair “15 : 208” is an odd one.

Q72. Answer: (a) Y

Given:

Row 1: A, B, C, D and E facing the North.

Row 2: V, W, X, Y and Z facing the South.

1) Neither A nor B sit at any of the extreme ends of the row. A sits second to the right of B.

2) The one who faces B is an immediate neighbour of Z.

3) Y sits second to the left of Z.

4) The one who faces Y sits second to the left of C.

Case II is not possible.

5) W sits second to the right of V.

6) D is not an immediate neighbour of A.

7) Final sitting arrangement is:

Hence, "Y" faces E.

Q73. Answer: (a) 25

Given:

1) Four students ranked between Rahul and Sreeja. Sreeja ranked 14th from the top while Rahul ranked 7th from the bottom.

2) Total number of students

=> Total number students = Sreeja's rank from top + Rahul's rank from bottom + students between Rahul and Sreeja

=> Total number students = 14 + 7 + 4 = 25

Hence, there are “25” students in the class.

Q74. Answer: (a) Air-to-Air Missile

The correct answer is Air-to-Air Missile.

Key Points

• The Defence Research and Development Organisation (DRDO), successfully test-fired the 5th generation Python-5 missile from Tejas aircraft, at Goa.

• The Python-5 missile is an Air-to-Air missile (AAM).

• The operational range of the Python-5 missiles is more than 20 KM.

Important Points

• Defence Research and Development Organisation (DRDO):

• Founded: 1958

• Headquarters: DRDO Bhavan, New Delhi

• Motto: "Balasya Mulam Vigyanam"

• Comes under the Ministry of Defence

• Chairman: Samir V Kamat

• DRDO Day: 1 January.

Q75. Answer: (a) Narmada

The correct answer is Narmada.

Key Points

• The Sardar Sarovar Dam is a concrete gravity dam located in the Narmada district in Gujarat.

• On the Narmada river, the Sardar Sarovar dam is being constructed.

• The Sardar Sarovar dam provides water and energy to Gujarat, Madhya Pradesh, Maharashtra, and Rajasthan.

• The foundation stone of the project was laid out by Prime Minister Jawaharlal Nehru on 5 April 1961.

• Prime Minister Narendra Modi dedicated the dam to the nation in 2017.

Important Points

• Narmada is the largest west-flowing peninsular river in India.

• Narmada is also known as the 'lifeline of Madhya Pradesh'.

• Between the Vindhya and Satpura ranges, it flows through a rift valley.

• Kanha National Park is located on the banks of the Narmada River.

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Additional Information

• The Ganges is the national river of India.
• The river Ganga is known as the Padma in Bangladesh.
• The Brahmaputra originates from the Chemayundung glacier near Manasarover lake in Tibet.
• The Brahmaputra is known as Dihang in Arunachal Pradesh.
• The Brahmaputra River enters India west of Sadiya, Arunachal Pradesh.
• The Brahmaputra is the Indian River with the greatest volume of water.
• The river Sutlej, on which the Bhakra Dam has been built, originates from Rakas lake in Tibet.
• The Godavari is India's second-longest river after the Ganga.

Major Dams in India:

List Of Major Dams in India	State	River
Tungabhadra Dam	Karnataka	Tungabhadra
Rihand Dam	Uttar Pradesh	Rihand
Maithon Dam	Jharkhand	Barakar
Koyna Dam	Maharashtra	Koyna
Mettur Dam	Tamil Nadu	Kaveri
Krishnarajasagar Dam	Karnataka	Kaveri
Indira Sagar Dam	Madhya Pradesh	Narmada
Sardar Sarovar Dam	Gujarat	Narmada
Nagarjuna Sagar Dam	Telangana	Krishna
Hirakud dam	Odisha	Mahanadi
Bhakra Nangal Dam	Punjab-Himachal Pradesh Border	Sutlej
Tehri Dam	Uttarakhand	Bhagirathi
Chakra Dam	Karnataka	Chakra
Pillur Dam	Tamilnadu	Bhavani

Q76. Answer: (c) 270

Given:

Sunita won 3/5 of the marbles that were there in the beginning of the game.

Ravi won 2/3 of the remaining marbles while Sunny won the remaining 60 marbles.

Calculation:

Let there be 150Q marbles at the beginning of the game.

Hence,

Sunita won = 150Q × 3/5 = 90Q

Ravi won = (150Q - 90Q) × 2/3 = 40Q

According to the question,

90Q + 40Q + 60 = 150Q

=> 20Q = 60

=> Q = 3

=> 90Q = 90 × 3

=> 90Q = 270

Therefore Sunita win 270 marbles.

Q77. Answer: (b) WTLID

The table is alphabets place value:

The pattern followed here is:

Alphabets arranged in descending order

BYTEW is related to YWTEB

And,

AMFQC is related to QMFCA

Similarly,

TILDW related to

Hence, 'TILDW' is coded as "WTLID".

Q78. Answer: (a) Annie Besant

The correct answer is Annie Besant.

• Annie Besant was an British activist, a campaigner for women's rights and a supporter of Indian nationalism

Key Points

• Annie Besant:

• She was connected to the Home Rule Movement in India.

• Annie Besant launched the All India Home Rule League in 1916 along with Bal Gangadhar Tilak.

• Annie Besant was an ardent supporter of Irish self-rule.

• Annie Besant fought for the freedom of thought, secularism, women's rights, and various social issues.

• Annie Besant converted to Theosophy after meeting Helena Blavatsky in 1889.

• She came to India for the first time in 1893 as part of the Theosophical Society.

• Annie Besant was the society's president from 1907 to 1933.

• Annie Besant set up the Central Hindu College (CHC) at Benares in 1898.

• She also joined the Indian National Congress (INC).

• She also became the Congress President in 1917.

Additional Information

• Florence Nightingale:

• She was a British nurse, statistician, and social reformer who was the foundational philosopher of modern nursing.

• She was the first woman awarded the Order of Merit (1907).

• International Nurses Day, observed annually on May 12, commemorates her birth and celebrates the important role of nurses in health care.

Q79. Answer: (c) Cochin

The correct answer is Cochin.

Key Points

• Cochin Port

• Cochin Port or Kochi Port is a major port on the Arabian Sea - Laccadive Sea – Indian Ocean sea-route

• The port lies on two islands in the Lake of Kochi: Willingdon Island and Vallarpadam, towards the Fort Kochi river mouth opening onto the Laccadive Sea.

Important Points

• Paradip Port

• Paradip Port is a natural, deep-water port on the East coast of India in the Jagatsinghpur district of Odisha.

• It is situated at the confluence of the Mahanadi river and the Bay of Bengal.

• Mangalore Port

• New Mangalore Port is a deep-water, all-weather port at Panambur, Mangalore in Karnataka state in India.

• It is the deepest inner harbour on the west coast.

• Calicut port is in Kerala.

Additional Information

Major Ports of India

• Kandla Western coast Gujarat

• Paradip Eastern Coast Odisha

• JNPT Western coast Maharashtra

• Mumbai Western coast Maharashtra

• VisakhapatnamEastern Coast Andhra Pradesh

• Chennai Eastern coast Tamil Nadu

• Kolkata Eastern coast West Bengal

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• Mangalore western coast Karnataka
• Tuticorin Eastern coast Tamil Nadu
• Mormugao Western coast Goa
• Kochi western coast Kerala
• Krishnapatnam port Eastern Coast Andhra Pradesh
• Ennore Eastern Coast Tamil Nadu

Q80. Answer: (a) Rs. 2,200

Given:
A family spends Rs. 4,600, Rs. 5,600, Rs. 4,800, Rs. 3,800, and Rs. 6,000 on groceries in the first 5 months of a year.
Average expenditure to be maintained throughout 6 months = Rs. 4500
Concept used:
Total = Average × Number of entities
Calculation:
Total expenture on groceries as of 5th month = Rs. (4,600 + 5,600 + 4,800 + 3,800 + 6,000) = Rs. 24,800
Total expenditure has to be maintained according to the average = Rs. (4500 × 6) = Rs. 27000
Hence, the expenditure on groceries in the 6th month = Rs. (27000 - 24800) = Rs. 2200
Therefore The family should spend Rs. 2,200 in the 6th month to make the 6 months average spending of the family on groceries to Rs. 4,500.

Q81. Answer: (c) 37.20

Shortcut Trick
Ratio of multipliers: Correct : Incorrect = 2.4 : 4.2 = 4 : 7.
Since the original number is the same, the products are proportional to the multipliers.
7 units (Incorrect product) = 65.1
1 unit = 65.1 ÷ 7 = 9.3
4 units (Correct product) = 4 × 9.3 = 37.20
Therefore The correct answer is 37.20.
Alternate Method
Given: Incorrect multiplier = 4.2, Incorrect product = 65.1, Correct multiplier = 2.4.
Formula Used: Correct Product = (Incorrect Product ÷ Incorrect Multiplier) × Correct Multiplier
=> Let the original number that Arushi intended to multiply be x.
=> According to the wrong calculation: 4.2 × x = 65.1
=> x = 65.1 ÷ 4.2
=> x = 651 ÷ 42 = 15.5
=> The correct product should have been: 2.4 × x
=> Correct Product = 2.4 × 15.5
=> Correct Product = 37.20
Therefore The correct answer is 37.20.
Additional Information
Proportionality in Multiplication
If a constant number is multiplied by different factors, the products are directly proportional to those factors: P1/M1 = P2/M2.
Percentage Error
Percentage error can be calculated using |Experimental Value − Theoretical Value| ÷ Theoretical Value × 100.
Decimal Multiplication Shortcut
When dividing or multiplying decimals, multiply by powers of 10 to convert them into whole numbers for easier calculation.

Q82. Answer: (a) sterilisation

The correct answer is Sterilisation.
• The intervention by the monetary authority of a country in the money market to keep the money supply stable against external shocks is called Sterilisation.
Key Points
• Sterilisation refers to the process by which the RBI takes away money from the banking system to neutralise the fresh money

that enters the system.

• Suppose the RBI decides to buy US dollars (USD) from the market. Now, the money held by the RBI does not form part of the banking system.

• So, if the RBI releases rupees from its coffers to buy dollars, the money supply in the banking system increases.

• That can be a problem.

• If the volume of goods and services produced in the economy remains unchanged, the extra money will lead to an increase in the prices of all commodities.

• More money in the banking system means higher bond prices because banks will have more money, and they will buy more bonds.

• And that will push up bond prices. Since bonds carry an inverse price-yield relationship, higher bond prices mean lower yields.

• The problem is that lower yields will force the RBI to cut interest rates further.

Additional Information

• The ratio of money held by the public in currency to that they hold in bank deposits is the Currency Deposit Ratio (CDR).

• This reflects liquidity in the system.

• The proportion of the total deposits commercial banks keeps as reserves are the Reserve Ratio.

• It includes:

Cash Reserve Ratio	**It is the fraction of money that banks must deposit with the RBI. Banks do not earn any interest on this amount.**
Statutory Liquidity Ratio	It is the fraction of the total deposits of a bank that must be kept in a liquid form. Banks can use this money to purchase Government Securities (G-Sec).

Q83. Answer: (b) 116

The pattern followed here is:

Hence, '116' is the correct answer.

Q84. Answer: (a) Narendra Modi

The correct answer is Narendra Modi.

Key Points

• PM Narendra Modi virtually inaugurated and lay the foundation stone of various projects worth Rs. 83 crores at the historic Somnath Temple in Gujarat on 20 August 2021.

• According to the temple authorities, Prime Minister Modi is the chairman of the Shree Somnath Trust.

• He inaugurates three projects and also performs a virtual ground-breaking ceremony for the Parvati Temple.

• Gujarat:

• Chief Minister - Bhupendrabhai Patel

• Governor - Acharya Devvrat.

• Number of Districts - 33.

• Lok Sabha seats - 26.Rajya Sabha seats - 11.

Q85. Answer: (d) Only conclusion I follows.

Statements:

Some dogs are donkeys.

No donkey is a horse.

Venn diagram:

Conclusions:

I. Some dogs are not horses → True (because some dogs are donkeys and no donkey is a horse so definitely some dogs are not horses)

II. Some horses are dogs → False (it is possible but not defined)

Hence, “Only conclusion I follows”.

Q86. Answer: (d) 216

Shortcut Trick

Given, LCM + HCF = 21 × HCF = 504 => HCF = 24, and LCM = 20 × 24.

Numbers are 24x and 24y (where x, y are co-prime). Their difference is 24 => x − y = 1.

LCM = 24xy = 20 × 24 => xy = 20.
Factors of 20 with a difference of 1 are 5 and 4 => x = 5, y = 4.
Sum of numbers = 24(x + y) = 24(5 + 4) = 216.
Therefore The correct answer is 216.
Alternate Method
Given:
LCM = 20 × HCF
LCM + HCF = 504
Difference of numbers = 24
Number 1 = 120 (5 parts)
Number 2 = 96 (4 parts)
Diff = 24
Total Sum = 120 + 96 = 216
Calculations:
=> Let the HCF of the numbers be H.
=> Given, LCM = 20H
=> LCM + HCF = 504
=> 20H + H = 504
=> 21H = 504 => H = 24
=> So, HCF = 24 and LCM = 20 × 24 = 480
=> Let the two numbers be 24x and 24y, where x and y are co-prime.
=> Difference of the numbers = 24x − 24y = 24
=> 24(x − y) = 24 => x − y = 1
=> We know that Product of numbers = LCM × HCF
=> (24x) × (24y) = 480 × 24
=> 24xy = 480 => xy = 20
=> The co-prime factors of 20 with a difference of 1 are 5 and 4.
=> Therefore, x = 5 and y = 4.
=> The numbers are 24 × 5 = 120 and 24 × 4 = 96.
=> Sum of the numbers = 120 + 96 = 216.
Therefore The correct answer is 216.
Additional Information
Product of Two Numbers
The product of any two numbers is always equal to the product of their HCF and LCM. Formula: N1 × N2 = HCF × LCM.
Co-prime Factors Rule
If two numbers have an HCF of H, they can be written as Hx and Hy, where x and y are always co-prime to each other.
LCM of Numbers with a given HCF
The LCM of two numbers Hx and Hy (where x and y are co-prime) is given by the formula LCM = H × x × y.

Q87. Answer: (d) 40 years

Shortcut Trick
Present total age of X, Y, and Z = 44 × 3 = 132 years.
Present average age of X and Y = 38 + 8 = 46 years.
Present total age of X and Y = 46 × 2 = 92 years.
Present age of Z = 132 − 92 = 40 years.
Therefore The correct answer is 40 years.
Alternate Method
Given:
Present average of X, Y, and Z = 44 years
Average of X and Y (8 years ago) = 38 years
Formula Used:
Sum of ages = Average age × Number of persons

=> Total present age of X, Y, and Z = 44 × 3 = 132 years.

=> Total age of X and Y (8 years ago) = 38 × 2 = 76 years.

=> Present total age of X and Y = 76 + (8 × 2) = 76 + 16 = 92 years.

=> Present age of Z = (Total age of X, Y, Z) − (Total age of X, Y)

=> Age of Z = 132 − 92 = 40 years.

Therefore The correct answer is 40 years.

Additional Information

Average Age Increment

If the age of each person in a group increases by n years after a period of n years, the average age of the group also increases by exactly n years.

Sum of Observations

The total sum of ages is always calculated as Average Age × Number of Persons.

Age Difference Constant

The numerical difference between the ages of any two individuals remains constant throughout their lives.

Q88. Answer: (c) PV Sindhu

The correct answer is PV Sindhu.

Key Points

• In the Badminton bronze medal match, PV Sindhu defeated He Bing Jiao in straight games to clinch the bronze medal at the Tokyo Games and become the first Indian woman to win two individual Olympic medals.

• After becoming the first Indian female athlete to win a Silver medal at the Olympics in Rio 5 years ago, PV Sindhu has become only the 2nd Indian athlete after Sushil Kumar to win 2 individual medals at the Games.

• PV Sindhu: Achievements

• In January 2020, PV Sindhu was awarded the Highest Civilian Award in India- Padma Bhushan.

• In March 2015, Sindhu was awarded the Fourth Highest Civilian Award in India- Padma Shri.

• In August 2016, she was awarded the Highest Sporting Honour of India- Rajiv Gandhi Khel Ratna.

• In September 2013, PV Sindhu was awarded the Arjuna Award for outstanding performance in sports. etc.

Additional Information

Sports Person	Olympic medal
Mirabai Chanu	Mirabai Chanu won the silver medal in weightlifting at the ongoing Tokyo Olympics.
Karnam Malleswari	Karnam Malleswari is a retired Indian weightlifter, She is the first Indian woman to win a medal at the Olympics when she finished third in the 69 kg category, At the 2000 Sydney Olympics.
Saina Nehwal	She is the first Indian badminton player to have won an Olympic medal, she won the bronze medal at the London 2012 Games.

Q89. Answer: (c) 872

According to the given information

Word	Code
F	7
U	2
N	8

‘FUN’ is coded as "872".

Hence, '872' is the correct answer.

Q90. Answer: (d) 135

Given:

21, 9, 40 = 149

18, 7, 25 = 101

15, 11, 30 = ?

The logic followed here is:

(1^(st) number × 2^(nd) number) – 3^(rd) number = RHS

Now follow the steps:

21, 9, 40 = 149

= (21 × 9) - 40

= 189 – 40

= 149 = Answer

And,

18, 7, 25 = 101

= (18 × 7) - 25

= 126 – 25

= 101 = Answer

Similarly,

15, 11, 30 = ?

= (15 × 11) - 30

= 165 – 30

= 135 = Answer

Hence, "135" is correct answer.

Q91. Answer: (a) WM

The pattern followed here is:

Hence, 'WM' is the correct answer.

Q92. Answer: (c) 1990

The correct answer is 1990.

Key Points

• The first Human Development Report was published in 1990 by Pakistani Economist Mahbub ul Haq and Indian Nobel laureate Amartya Sen.

• The Human Development Report (HDR) is an annual report published by the Human Development Report Office of the United Nations Development Programme.

• Human Development Report categories countries based on 3 dimensions

1. A long and healthy life,

2. Access to knowledge, and

3. A decent standard of living.

• According to the 2020 report Norway has topped the list followed by Ireland and Switzerland.

• India holds the rank of 131 out of 189 countries in HDI 2021.

• Among Asian countries, Singapore topped the list with the rank of 11.

In News

• 136th is the rank of India in the Human Happiness Index 2022 report.

• The Happiness Index is a development philosophy as well as an index which is used to measure collective happiness in the Nation.

• Finland got the first rank in the human happiness index.

• Finland was named the happiest nation in the world for the last five years.

• Afghanistan got 146th rank in the happiness Index.

• India Rank in Human Happiness Index 2021 report: 139

Q93. Answer: (b) 3

According to the given information,

A letter should be immediately preceded by a symbol and immediately followed by a number.

• Symbol → Letter → Number

(Left) € A 5 # 6 λ 5 D P A ¥ 8 R 2 Z * Q 9 B L 5 6 % $ H 2 F # 6 (Right)

For the following combinations, the condition is satisfied:

• [€ A 5], [* Q 9], [$ H 2]

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Hence, “3” is the correct answer.

Q94. Answer: (a) Occupational composition

The correct answer is Occupational composition.

Key Points

• Population change:

• Population change, defined generally, is the difference in the size of a population between the end and the beginning of a given time period (usually one year).

• The main components of population change are births, deaths, and migration.

• “Natural increase” is defined as the difference between live births and deaths.

• “Net migration” is defined as the difference between the number of people moving into an area and the number of people moving out.

• The population change is calculated by the formula -- [Population change = (Births + Immigration) – (Deaths + Emigration)]

Additional Information

• The occupational structure of any country is defined by the segment of a country’s population that is engaged in economic ventures and various professions.

• To define occupational structure more simply, the different demographic sections of a country who are employed in different sectors like agriculture, manufacturing and transport, among many others constitute the occupational structure of a nation.

Q95. Answer: (c) QVDZW

The logic here is,

EYBRD : VBYIW

And,

DAJKO : WZQPL

Similarly,

JEWAD : ?

Hence, "QVDZW" is the correct answer.

Q96. Answer: (d) Thursday

Given:

1)Swetha correctly remembers that Ajay's exam is before Friday but after Tuesday.

Tuesday	
Wednesday	Exam
Thursday	Exam
Friday	

2) Kavya correctly remembers that Ajay's exam is after Wednesday but before Saturday.

Wednesday	
Thursday	Exam
Friday	Exam
Saturday	

• Thursday in common in the cases of Swetha and Kavya.

So, Ajay's exam correctly falls on Thursday.

Hence, “Thursday” is the correct answer.

Q97. Answer: (b) 1977

The correct answer is 1977.

Key Points

• Society for the Promotion of Indian Classical Music And Culture Amongst Youth (SPIC MACAY) is a voluntary youth movement which promotes intangible aspects of Indian cultural heritage.

• It does this by promoting Indian classical music, classical dance, folk music, yoga, meditation, crafts and other aspects of Indian culture.

• It is a movement with chapters in over 300 towns all over the world.

• It was established by Dr Kiran Seth in 1977 at IIT Delhi.

Q98. Answer: (d) Suvarnagiri

The correct answer is Suvarnagiri.

Key Points

• Suvarnagiri at the southern extent of the Mauryan Empire had gold mines.

• It was considered the Gold mine hub in Karnataka.

• It was an important source of revenue for the empire.

Additional Information

• Chandragupta Maurya founded the Maurya Empire in 322 BCE when he conquered the kingdom of Magadha and the northwestern Macedonian satrapies.

• Maurya Empire was founded in 322 BCE by Chandragupta Maurya, who had overthrown the Nanda Dynasty and rapidly expanded his power westward across central and western India in order to take advantage of the disruptions of local powers in the wake of the withdrawal by Alexander the Great's armies.

• According to legend, the teacher Chanakya convinced his disciple, Chandragupta Maurya, to conquer the kingdom of Magadha (the Nanda Empire) when he was insulted by its king Dhana Nanda.

• Chandragupta Maurya expanded the Maurya Empire north and west as he conquered the Macedonian Satrapies and won the Seleucid-Mauryan war.

Q99. Answer: (c) North-east

Drawing the diagram according to the given information,

1. A bank is to the east of a shop.

2. A college is to the north-west of the Bank.

3. A bus stop is to the north of the shop and to the west of the college.

Hence, the college is in "North-east" direction with respect to the shop.

Q100. Answer: (d) Windows logo key + L

The correct answer is Windows logo key + L.

Important Points

• The Start Menu offers an option for locking your PC. Just click the Start button (the Windows icon), select your account name, and then click “Lock.”

• In addition to locking it from the Start menu, letting it lock automatically after a period of inactivity, and even using Bluetooth to lock when it senses you've left, there are two ways to lock Windows with quick keyboard shortcuts.

• The Ctrl+Alt+Delete keyboard shortcut is commonly used to kill unresponsive software, but you can also use it to lock your computer. Press Ctrl+Alt+Delete, and then click “Lock” in the menu that appears.

• There's an even faster way to lock the screen — do it in a single keystroke. Press the Windows and L keys at the same time. It should lock instantly.

Additional Information

• Windows logo key + l is used to lock the computer.

• Windows logo key + i is used to open settings.

• Windows logo key + f is used to open the feedback hub.

• Windows logo key + r is used to open the run window.

Q101. Answer: (d) Aoleang Monyu

The correct answer is Aoleang Monyu.

Key Points

• Aoleang Monyu is the spring festival of Konyak Naga tribe, of Nagaland.

• This may also be called as festival of spring. It is the greatest of all the festivals that Konyak Naga observes.

• This Aoleang festival is as old as the people of Konyak.

• It has been observing since the time immemorial.

• Konyak Aoleang is observed from 1st-6th April every year.

Additional Information

Important Festivals of North East India	

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State	Festivals
Arunachal Pradesh	Boori Boot, Myoko, Dree, Pongtu, Losar, Monpa festival
Assam	Ambubachi, Bhogali Bihu, Baishagu, Dehing Patkai
Mizoram	Chapcharkut Festival
Nagaland	Hornbill festival, Tsukheneye, Sekreny
Meghalaya	Nongkrem festival, Khasis festival, Wangla
Manipur	Yaoshang, Porag, Chavang Kut
Tripura	Kharchi Puja

Q102. Answer: (a) R

• D, E, L, M, R, S, Y and Z are sitting around a square table facing the centre of the table.

• Four of them are sitting at each of the corners, while the other four are sitting at the exact centre of each of the sides.

1) D sits in the middle of one of the sides of the table.

2) Only one person sits between D and E.

3) L sits to the immediate right of E.

4) Only three people sit between L and M when counted from the right of L.

5) R is an immediate neighbour of L.

Case-II is not possible.

6) S sits to the immediate left of Y.

7) Only Z is left and one position is left so the final sitting arragment is:

Thus, “R” sits third to the right of Z.

Q103. Answer: (a) Seventh

The correct answer is Seventh.

Key Points

• The main objectives of the Seventh Five-Year Plan were to establish growth in areas of increasing economic productivity, production of food grains, and generating employment through "Social Justice".

• The Seventh Five-Year Plan was led by the Congress Party with Rajiv Gandhi as the prime minister.

• The plan laid stress on improving the productivity level of industries by upgrading technology.

• The Seventh Plan had strived toward socialism and energy production at large.

• The thrust areas of the Seventh Five-Year Plan were:

• Social justice, removal of oppression of the weak, using modern technology, agricultural development, anti-poverty programmes, a full supply of food, clothing, and shelter, increasing the productivity of small- and large-scale farmers, and making India an independent economy.

• The target growth rate was 5.0% and the actual growth rate was 6.01% and the growth rate of per capita income was 3.7%.

Q104. Answer: (d) Phanigiri

The correct answer is Phanigiri.

Key Points

• In April 2019, archaeologists unearthed a life-sized stucco sculpture from a Buddhist site called Phanigiri in Telangana.

• A life-sized stucco sculpture of a Bodhisattva has been unearthed at Phanigiri, a Buddhist site in southern India dating back to the first century BC.

• In 1941, the preliminary excavation at Phanigiri was started by Khaja Muhammad Ahmad of the archaeology department of the then former Hyderabad state.

Additional Information

• Phanigiri

• It is a Buddhist site in Suryapet District, Telangana.

• The excavations conducted here have yielded a Maha Stupa, a stone pillared congregation hall, three Viharas, two Apsidal Chaityagruhas, Sculptured panels including Jataka stories, Brahmi label inscriptions belonging to Satavahana and Ikshavaku dynasties, coins belonging to Mahatalavarasa, Satavahana, and Ikshavaku Kings besides early historic cultural materials dateable to 1st Century B.C. to 3rd Century A.D.

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Q105. Answer: (c) Both Statements I and II together are sufficient to answer the question.

Statements:

I. Tika has only one son, Bhola and only one daughter, Kamala.

II. Damini is Roma's son's wife. Kamala is the only daughter of Roma. Meghan is the daughter of Bhola.

When combining Statement I and II:

Thus, Damini is the wife of Bhola.

Hence, "Both Statements I and II together are sufficient to answer the question."

Q106. Answer: (a) 8%

Given:

A sum of money at certain rate of interest when compounded annually becomes Rs. 625 in 3 years and Rs. 675 in 4 years.

Concept used:

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

where

P = Principal amount

R = Rate of interest per year

T = Time in years

Calculation:

Considering the 4-year investment, the sum at the end of the 3rd year i.e. Rs. 625 acts as the principal amount for the 4th year.

We know that one year of compound interest is equivalent to one year of simple interest.

Let the rate of interest be R%.

According to the question,

625 + (625 × R × 1) ÷ 100 = 675

=> (625 × R × 1) = 5000

=> R = 8

Therefore The rate of interest per annum is 8%.

Q107. Answer: (a) Six

The correct answer is Six.

Key Points

• The Union Heavy Industries and Public Enterprises and Information and Broadcasting Minister Prakash Javdekar virtually launched six technology innovation platforms, on 2 July 2021.

• These platforms will focus on certain identified mother technologies which will cover the manufacturing sector, capital goods, and mobility together for current and future needs.

• These platforms will facilitate industry, including OEMs (original equipment manufacturers), Tier 1, 2, and 3 companies and raw material makers, start-ups, domain experts/professionals, R&D institutions.

Q108. Answer: (c) −40.8

Given:

32% of 22.5 − 2/3 × cbrt512 × √81 = y

Concept used:

Calculation:

32% of 22.5 − 2/3 × cbrt512 × √81

=> (0.32 of 22.5) − 2/3 × cbrt512 × √81

=> 7.2 - 2/3 × 8 × 9

=> 7.2 - 48

=> - 40.8

=> y

Therefore The value of y is -40.8.

Q109. Answer: (a) −1/2

Shortcut Trick

Use the complementary angle property where cos(45^o+θ) = sin(45^o−θ).

The numerator becomes $\sin^2(45^o-\theta) + \cos^2(45^o-\theta) = 1$.

Substitute standard values in the denominator: $(2)^2 \times (1/\sqrt{2})^2 - (2)^2 = 4 \times (1/2) - 4 = -2$.

The final value is $1 / -2 = -1/2$.

Therefore The correct answer is $-1/2$.

Alternate Method

Given: $\cos^2(45^\circ+\theta) + \cos^2(45^\circ-\theta) / (\text{cosec}^2\ 30^\circ \times \sin^2\ 45^\circ - \sec^2\ 60^\circ)$

Formula Used: $\cos(90^\circ - A) = \sin A$; $\sin^2 A + \cos^2 A = 1$; $\text{cosec}\ 30^\circ = 2$; $\sin 45^\circ = 1/\sqrt{2}$; $\sec 60^\circ = 2$.

=> Numerator = $\cos^2(45^\circ + \theta) + \cos^2(45^\circ - \theta)$

=> Let $A = 45^\circ + \theta$. Then $90^\circ - A = 45^\circ - \theta$.

=> Numerator = $\sin^2(90^\circ - (45^\circ + \theta)) + \cos^2(45^\circ - \theta)$

=> Numerator = $\sin^2(45^\circ - \theta) + \cos^2(45^\circ - \theta) = 1$

=> Denominator = $\text{cosec}^2\ 30^\circ \times \sin^2\ 45^\circ - \sec^2\ 60^\circ$

=> Denominator = $(2)^2 \times (1/\sqrt{2})^2 - (2)^2$

=> Denominator = $4 \times (1/2) - 4$

=> Denominator = $2 - 4 = -2$

=> Final Value = $1 / -2 = -1/2$

Therefore The correct answer is $-1/2$.

Additional Information

Trigonometric Identities

Fundamental identities include $\sin^2\theta + \cos^2\theta = 1$, $1 + \tan^2\theta = \sec^2\theta$, and $1 + \cot^2\theta = \text{cosec}^2\theta$.

Complementary Angle Relations

For any angle θ, $\sin(90^\circ-\theta) = \cos\theta$, $\tan(90^\circ-\theta) = \cot\theta$, and $\sec(90^\circ-\theta) = \text{cosec}\theta$.

Standard Values Table

$\sin 30^\circ = 1/2$, $\sin 45^\circ = 1/\sqrt{2}$, $\sin 60^\circ = \sqrt{3}/2$; cos values are the reverse. cosec, sec, and cot are reciprocals of sin, cos, and tan.

Q110. Answer: (b) Thursday

Odd days:

A non-leap year has 365 days and a leap year has 366 days.

Non-leap year = 365 days or 52 weeks and 1 day. So, here the number of odd days is 1.

Leap year = 366 days or 52 weeks and 2 days So, here the number of odd days are 2.

• So, total number of odd day between 2006 and 2007 = 1 (Total Non- leap year) = 1 odd day

Thursday on February 1, 2007

=> Day on 1 February 2006 = Thursday – 1 = Wednesday

Therefore, 1 February 2006 = Wednesday

Now,

• February 2, 2006 = 1 February 2006 + 1 day

= Wednesday + 1

= Thursday

Hence, February 2, 2006 was “Thursday”.

Q111. Answer: (c) RSQBOHF

The pattern followed here is:

'MISTAKE' is written as 'LHRUBLF'

And,

'PROBLEM' is written as 'OQNCMFN'

Similarly,

'STRANGE' be written as

Hence, ' STRANGE' is coded as 'RSQBOHF'

Q112. Answer: (a) 20

Given:

A train covers a distance of 57.6 km in 48 minutes.

Concept used:

1m/s = 18/5 km/h

Time × Speed = Distance

Calculation:

48 minutes = 48 ÷ 60 = 0.8 hours

Hence, the speed of the train = 57.6 ÷ 0.8 = 72 km/h

Thus, the speed of the train = 72 ÷ (18/5) = 20 m/s

Therefore Its speed is 20 m/s.

Q113. Answer: (a) 1175 m

Given:

A train running at 90 km/h crosses an electric pole in 18 seconds and a platform in 65 seconds.

Concept used:

1m/s = 18/5 km/h

While a train crosses a platform, it crosses the sum of its length and the length of the platform

While a train crosses an electric pole, it crosses its own length.

Calculation:

Let the length of the platform be P meters.

90 kmph = 90 ÷ 18/5 = 25 meters per second (mps)

Hence, the length of the train = 25 × 18 = 450 meters.

According to the question,

25 × 65 = (450 + Q)

=> 1625 = 450 + Q

=> Q = 1175

Therefore The length of the platform is 1175 m.

Q114. Answer: (a) 3% loss

Given:

A shopkeeper mixes 30 kg of rice which he purchased at Rs. 30/kg and 40 kg of rice which he purchased at Rs.28/kg and he sells the entire mixture at Rs. 28/kg.

Concept used:

Loss% = (Cost Price - Selling Price)/(Cost Price) × 100%

Calculation:

The total cost price of two different rice

=> (30 × 30) + (40 × 28)

=> Rs. 2020

Total selling price of the total rice = 28 × (30 + 40) = Rs. 1960

Hence, the loss % = (2020 - 1960)/2020 × 100% ≈ 60/2020 × 100% ≈ 2.97% ≈ 3%

Therefore The loss percentage is 3%.

Q115. Answer: (c) 12 : 13

Given:

2 litres of a liquid having milk and water in the ratio 3 : 2 is mixed with 3 litres of a liquid having milk and water in the ratio 2 : 3.

Calculation:

Let the common ratios be x and y in respective cases.

In the mixture of 2 litres,

Quantity of milk = 2 × 3x/5x = 1.2 litres

Quantity of water = (2 - 1.2) = 0.8 litres

In the mixture of 3 litres,

Quantity of milk = 3 × 2y/5y = 1.2 litres

Quantity of water = (3 - 1.2) = 1.8 litres

Hence in the new mixture,

Quantity of milk = 1.2 + 1.2 = 2.4 litres

Quantity of water = 0.8 + 1.8 = 2.6 litres

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The ratio of milk to water in the new mixture = 2.4 : 2.6 = 12 : 13

Therefore The ratio of milk to water in the new mixture is 12 : 13.

Q116. Answer: (c) Article 368

The correct answer is Article 368.

Key Points

• Part XX of Article 368 empowers the Parliament to amend Constitution by way of addition, variation or repeal of any provision according to the procedure laid down therein, which is different from the procedure for ordinary legislation.

• Article 368 has been amended by the 24th and 42nd Amendments in 1971 and 1976 respectively. New clauses 368 (1) and 368 (3) were added by the 24th Amendment in 1971, which also added a new clause (4) in article 13 which reads, "Nothing in this article shall apply to any amendment of this Constitution made under article 368."

• Amending the constitution of India is the process of making amendments to the fundamental law or supreme law of the country.

• The amendment process in the constitution is set out in Part XX (Article 368) of the Indian Constitution.

• This procedure preserves the sanctity of India's Constitution and holds a check on the Indian Parliament's arbitrary power.

• Article 368 does not set down the legislative process to be followed at various points of the amendment.

Additional Information

• The first amendment was made to the Indian Constitution in 1951.

• The Constitution (First Amendment) Act, 1951, enacted in 1951, made several changes to the Fundamental Rights provisions of the Indian constitution.

• It provided means to restrict freedom of speech and expression, validation of zamindari abolition laws, and clarified that the right to equality does not bar the enactment of laws that provide "special consideration" for weaker sections of society.

• The formal title of the amendment is the Constitution (First Amendment) Act, 1951.

• It was moved by the then Prime Minister of India, Jawaharlal Nehru, on 10 May 1951 and enacted by Parliament on 18 June 1951.

Q117. Answer: (d) 7

According to the given information

Word	Code
round	1
watch	7

‘watch’ is coded as "7".

Hence, '7' is the correct answer.

Q118. Answer: (b) Average product

The correct answer is Average product.

Key Points

• The average product, also known as the output per unit of factor inputs or the average of the total product per unit of input, is determined by dividing the Total Product by the inputs (variable factors).

Additional Information

• The average cost per unit of production (AC) is also known as the average total cost (ATC). Divide the total cost (TC) by the quantity produced by the company (Q) to find it. The average cost has a significant impact on how companies price their goods.

• Firms' sales of specific commodities are directly proportional to the size of the market and how their competitors choose to operate.

• With cost on the vertical axis and quantity on the horizontal axis, an average cost curve can be shown.

• The average fixed cost (AFC) is calculated by dividing the fixed costs of production (FC) by the quantity (Q) of output generated.

• The variable cost per unit is the average variable cost in economics. The entire variable cost is divided by the output to get the average variable cost.

Q119. Answer: (d) 846 cm2

Shortcut Trick

Ratio of Length (L), Width (W), and Height (H) = 4 : 3 : 5

Sum of all 12 edges = 4 × (L + W + H) = 144 cm => L + W + H = 36 cm

Sum of ratio parts = 4 + 3 + 5 = 12 units

12 units = 36 cm => 1 unit = 3 cm

Dimensions: L = 12 cm, W = 9 cm, H = 15 cm
Total Surface Area = 2 × (12×9 + 9×15 + 15×12) = 2 × (108 + 135 + 180) = 2 × 423 = 846 cm²
Therefore The correct answer is 846 cm².
Alternate Method
Given:
Ratio L : W : H = 4 : 3 : 5
Sum of all edges = 144 cm
Formula Used:
Sum of edges of a cuboid = 4(L + W + H)
Total Surface Area (TSA) = 2(LW + WH + HL)
Calculations:
Let the dimensions be 4x, 3x, and 5x.
=> 4(4x + 3x + 5x) = 144
=> 4(12x) = 144
=> 48x = 144
=> x = 3
=> Length (L) = 4 × 3 = 12 cm
=> Width (W) = 3 × 3 = 9 cm
=> Height (H) = 5 × 3 = 15 cm
=> TSA = 2(12×9 + 9×15 + 15×12)
=> TSA = 2(108 + 135 + 180)
=> TSA = 2(423) = 846 cm²
Therefore The correct answer is 846 cm².
Additional Information
Volume of Cuboid
The space occupied by the cuboid is given by V = L × W × H.
Diagonal of Cuboid
The longest rod that can be placed inside is d = √(L² + W² + H²).
Lateral Surface Area
Area of the four walls = 2H(L + W).

Q120. Answer: (a) 68%

Calculation:
Total expenditure of 2017 = 361 + 93 + 83 + 142 + 52 = 731 Lakh
Total expenditure of 2021 = 652 + 111 + 132 + 101 + 75 = 1071 Lakh
% = 731/1071 × 100% ≈ 68.253% ≈ 68%
Therefore The company's total expenditure in 2017 was approximately 68% of its total expenditure in 2021.

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