RRB Group D Previous Year Paper (Held on: 16 Sept 2022 Shift 1)

RRB Group D • 2022 • 100 questions • 90 minutes • Answer key and solutions

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CBT

Q1. As per the Railway Budget of India 2022-23, the Finance Minister announced the production of 400 new Vande Bharat trains in three years and _____ km of the rail network will be brought under 'Kavach'.

(a) 3500
(b) 2000
(c) 4000
(d) 3000

Q2. The average weight of 6 persons increases by 2 kg when one of them whose weight is 72 kg is replaced by a new man. The weight of the new man is:

(a) 94 kg
(b) 104 kg
(c) 74 kg
(d) 84 kg

Q3. A vendor sells 10 pens for Rs. 7. He earns a profit of 40%. The cost price of one pen is:

(a) Rs. 0.60
(b) Rs. 0.56
(c) Rs. 0.50
(d) Rs. 0.45

Q4. In which year was Mendeleev's Periodic Table published in a German journal?

(a) 1892
(b) 1862
(c) 1872
(d) 1852

Q5. Three statements are given, followed by four conclusions numbered I, II, III and IV. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements

Statements:

1. Some pants are coats.
2. All coats are red.
3. All red are shirts.

Conclusions:

I. All pants are shirts.
II. All coats are shirts.
III. Some red are coats.
IV. Some shirts are pants.

(a) Only conclusions II, III and IV follow

(b) Only conclusions I, II and III follow
(c) All the conclusions follow
(d) Only conclusions I, III and IV follow

Q6. Who among the following is considered the first Tirthankara of Jainism?
(a) Neminath
(b) Parshvanath
(c) Vardhaman Mahavira
(d) Rishabhanatha

Q7. Refer to the following letter, number, symbol series and answer the question that follows.
(Left) A D 4 F @ T 5 H $ B R @ V T 6 # 7 H 6 D 8 $ % & G $ 3 C F (Right)
If all the symbols are dropped from the series, which of the following will be ninth to the left of the fifth from the right?
(a) R
(b) V
(c) H
(d) B

Q8. Complete the given homologous series of alcohols by choosing the correct option.
CH3OH, C2H5OH, _____, C4H9OH
(a) C3H7OH
(b) C5H12OH
(c) C5H10OH
(d) C3H6OH

Q9. The HCF and the LCM of two numbers are 44 and 264, respectively. If one of the numbers is 3 over 2 times of the other, what is the smaller number?
(a) 88
(b) 132
(c) 176
(d) 44

Q10. Which of the following types of epithelial tissues form a lining of lung alveoli?
(a) Columnar
(b) Ciliated columnar
(c) Squamous
(d) Cuboidal

Q11. If '+' means '-', '-' means '×', '×' means '÷', '÷' means '+', what will come in place of the question mark (?) in the following equation?
76 + 5 - 6 × 3 ÷ 4 = ?
(a) 68
(b) 72
(c) 70
(d) 71

Q12. If the three sides of a triangle are in the ratio 7 : 5 : 4 and its perimeter 48 m, then the area of triangle is:
(a) $36\sqrt{6}$ m²
(b) 34 m²
(c) $39\sqrt{6}$ m²
(d) $37\sqrt{6}$ m²

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Q13. Reflected ray passes through principal focus when incident ray _____.

(a) is parallel to principal axis of concave mirror
(b) is passing through C of convex mirror
(c) is parallel to principal axis of convex mirror
(d) is incident at the pole of plane mirror

Q14. Evaluate 95 × 103.

(a) 9685
(b) 9755
(c) 9785
(d) 9655

Q15. In this question, a group of letters is coded using symbols as per the table given below and the conditions which follow. The correct combination of codes following the conditions is your answer.

Letters	D	C	U	Q	I	A	R	E
Codes	@		^	%	=	#	$	•

Conditions:

i. If the first letter of the word is a vowel and last letter is a consonant, then both these letters will be coded as '*'.

ii. If the second letter of the word is a vowel and the fifth letter is a consonant, then both these letters will be coded as '&'.

What will be the code for the word 'ACQUIRED'?

(a) • > % = ^ $ + *
(b) • > % ^ = $ + *
(c) > % ^ = $ + @
(d) • > % ^ = $ + @

Q16. Select the option that represents the letters that, when placed from left to right in the same sequence in the blanks below, will complete the letter series.

_ _b a d c _ _ d _ b a d c b _

(a) dcbaac
(b) cdabca
(c) dcbaca
(d) dbcaca

Q17. This question is based on the following 3-letter words.

AIN, ONK, AST, EJO

If in each of the words, each letter is changed to the next letter in the English alphabetical order, how many words thus formed will have no vowel?

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

Q18. U, V, W, X, Y and Z live on different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it is numbered 2, and so on till the topmost floor is numbered 6. Z lives on the floor immediately above Y. Only one person lives between U and V. W lives immediately above Z and immediately below V. Who lives on the second floor?

(a) Z
(b) V
(c) U
(d) W

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Q19. Consider the below statements and identify the correct answer.

Statement-I: The metals high up in the reactivity series are not reactive.

Statement-II: The metals high up in the reactivity series can be obtained from their compounds by heating with carbon.

(a) Both the statements are true.
(b) Statement-II is true, and Statement-I is false.
(c) Statement-I is true, and Statement-II is false.
(d) Both the statements are false.

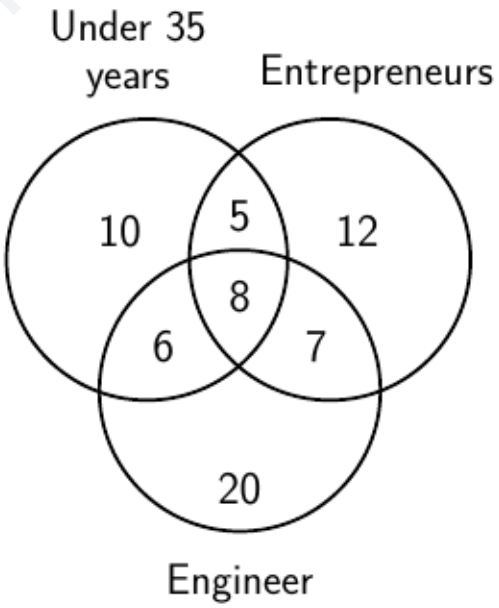
Q20. The sum of all the interior angles of a heptagon is equal to

(a) 720°
(b) 900°
(c) 540°
(d) 810°

Q21. Two plates and three spoons cost is Rs. 86. The cost of four plates and a spoon is Rs. 112. The difference between the cost of a plate and that of a spoon is _____.

(a) Rs. 16
(b) Rs. 13
(c) Rs. 26
(d) Rs. 18

Q22. Study the given diagram carefully and answer the question. The numbers in different sections indicate the number of persons.



How many person under 35 years of age are Engineers but NOT Entrepreneurs?

(a) 7
(b) 5
(c) 6
(d) 8

Q23. Why is carbon monoxide an air pollutant?

(a) Because it is converted into carbon dioxide
(b) Because it is present in vehicle exhaust
(c) Because it can kills RBCs
(d) Because it is reduces oxygen carrying capacity of blood

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Q24. The concept of judicial review in Constitution of India has been taken from the Constitution of which country?

(a) Australia
(b) United states of America
(c) New Zealand
(d) United Kingdom

Q25. A certain number of people are sitting in a row, facing North. P is an immediate neighbour of both V and T, while R is an immediate neighbour of both T and Q. V is at the extreme right end. There are only two people on the left of Q. If no other person is sitting in the row, what is the total number of persons seated?

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

Q26. 16 men can do a piece of work in 5 days. The number of men required to complete the same work in 20 days is:

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

Q27. Who among the following became the first Indian woman sailor to qualify for the Olympics in April 2021?

(a) Aishwarya Nedunchezhiyan
(b) Nethra Kumanan
(c) Sweta Shervegar
(d) Varsha Gautham

Q28. The cost price of 42 articles is equal to the selling price of 36 articles. What is the gain or loss made in the transaction?

(a) 16 2/3 % loss
(b) 14 1/7 % loss
(c) 14 1/7 % gain
(d) 16 2/3 % gain

Q29. In this question, a group of numbers/symbols is coded using letters as per the table given below and the conditions which follow. The correct combination of codes following the conditions is your answer.

Number\ symbol	**•**	**2**	**@**	**5**	**^**	**•**	**7**	**#**	**%**	**9**
Letter code	J	P	A	F	D	N	R	K	M	Z

Conditions:

(i) If the first element is a symbol and the last, a number, the codes for these two (the first and the last elements) are to be interchanged.

(ii) If the first element is an odd number and the last, an even number, the first and last elements are to be coded as $.

Which of the following will be the code for 75#2 ?

(a) RFK$
(b) FK
(c) FM
(d) RFKP

Q30. Which of the following Acts was aimed to provide for the extension of the provisions of Part IX of the Constitution relating to the Panchayats to the Scheduled Areas?

(a) MESA Act 1996
(b) PESA Act 1996
(c) NESA Act 1996

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(d) DESA Act 1996

Q31. If Rs. 1,368 is divided into two parts in the ratio of 5 : 3, then the amount (in Rs.) in the greater part is _____.

(a) 444.72
(b) 585.00
(c) 268.80
(d) 855.00

Q32. The number of non-square numbers between 87^2 and 88^2 is:

(a) 154
(b) 184
(c) 174
(d) 164

Q33. What will be the total amount payable on a sum of Rs. 12,500 after two years at the rate of 10% per annum if the interest is compounded annually?

(a) Rs. 18,500
(b) Rs. 15,125
(c) Rs. 25,000
(d) Rs. 17,790

Q34. The value of √1296/√121 × 15/(216)^(1/3) × 11 over √225 is _____.

(a) 36
(b) 15
(c) 6
(d) 11

Q35. What is the suffix in the name Propanoic Acid?

(a) oic acid
(b) Propane
(c) ane
(d) Prop

Q36. How many elements are present in the 7^(th) period of the Modern Periodic table?

(a) 8
(b) 2
(c) 32
(d) 18

Q37. A bulb draws 36 W when connected to a 12-V supply. If it is connected to a 6 V supply then power consumed will be:

(a) 6 W
(b) 24 W
(c) 12 W
(d) 9 W

Q38. Five persons are sitting in a straight row facing the north. Ram is sitting at the extreme left end and Sita is sitting at the extreme right end of the row. Kamal sits exactly in the middle of the row. Ravi is sitting exactly third to the left of Sita. Ritu is sitting exactly third to the right of Ram. Who is the immediate neighbour of Sita?

(a) Ravi
(b) Ram
(c) Kamal
(d) Ritu

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Q39. Who was awarded the 2021 DST-ICTP-IMU Ramanujan Prize for Young Mathematicians from developing countries for her outstanding work in affine algebraic geometry and commutative algebra?

(a) Amalendu Krishna
(b) Ritabrata Munshi
(c) Neena Gupta
(d) Ramdorai Sujatha

Q40. The salary of a person is Rs. 2,00,000. If he saves an amount of Rs. 88,000, then the person saves _____ of his salary.

(a) 44.00%
(b) 42.85%
(c) 42.74%
(d) 44.20%

Q41. In a house, a refrigerator set rated as 350 W is operated for 8 hours/day, a TV set rated as 150 W is operated for 5 hours/day, and an electric heater rated as 1500 W is operated for 30 minutes/day. If the energy cost per unit is Rs. 5.00, then the total expenditure of that house for 10 days for the TV set, refrigerator and electric heater will be:

(a) Rs. 220/-
(b) Rs. 230/-
(c) Rs. 215/-
(d) Rs. 225/-

Q42. Six friends C, D, E, F, G and H are sitting in a row facing north. F is 2^(nd) to the left of E, who is 2^(nd) to the left of G. D is 2^(nd) to the right of H, who is an immediate neighbour of E and G. Where is C seated?

(a) At the left end
(b) Between E and F
(c) Between H and D
(d) At the right end

Q43. Consider two wires of the same material, but the ratio of their cross-sectional areas is 1 : 10 and the ratio of their lengths is 2 : 5. If the same 10 V battery is connected across these two wires separately, what will be the ratio of the current flow in these two wires?

(a) 1 : 4
(b) 4 : 1
(c) 1 : 25
(d) 25 : 1

Q44. In the given letter-cluster pairs, the first letter-cluster is related to the second letter-cluster following a certain logic. Study the given pairs carefully, and from the given options, select the pair that follows the same logic.

MCD : PZG

LKG : OHJ

(a) QDH : TGK
(b) PBX : SEA
(c) TJQ : WGT
(d) NYB : QVY

Q45. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

(76, 171, 95)

(28, 63, 35)

(a) (44, 88, 55)
(b) (60, 105, 70)
(c) (24, 48, 30)

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(d) (52, 117, 65)

Q46. Akshay starts from the restaurant and travels 2 km southwards and then turns right and travels 4 km. He then turns left and travels 10 km, then he turns left and travel 4 km to reach his home. What is the shortest distance between the restaurant and home and what is restaurant's direction with respect to the home?

(a) 12 km, North
(b) 8 km, South
(c) 8 km, North
(d) 12 km, South

Q47. In an electric circuit, if power, voltage and resistance are represented by P, V and R, respectively, then the correct relation between them is:

(a) $P = (V^2)/R$
(b) $P = VR^2$
(c) $P = (V^2)/(R^2)$
(d) $P = V^2R$

Q48. Where in India is the Sree Sankaracharya University of Sanskrit situated?

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

Q49. Which of the following is similar to the plasma of blood but is colourless and contains less protein?

(a) RBC
(b) WBC
(c) Lymph
(d) Platelets

Q50. If α, β are the roots of the quadratic equation $x^2 - 11x + 18 = 0$, then the value of $\alpha^2 + \beta^2$ is:

(a) 105
(b) 75
(c) 85
(d) 95

Q51. This question is based on the five, three-digit numbers given below.

(Left) 653 831 933 476 715 (Right)

(Example: 697 - first digit = 6, second digit = 9, third digit = 7)

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

If 2 is added to the third digit of every number, in how many numbers will the third digit be exactly divided by the second digit of that number?

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

Q52. If '+' means '-', '-' means '×', '×' means '÷'and '÷' means '+', what will come in place of the question mark (?) in the following equation?

88 × 22 - 15 ÷ 40 + 19 = ?

(a) 91
(b) 101
(c) 81
(d) 201

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Q53. $\sec^2\theta + (\text{cosec}^2\theta - 1) - (1 + \tan^2\theta) - \cot^2\theta =$ _____.

(a) $\sec^2\theta$
(b) 1
(c) 0
(d) $\cot^2\theta$

Q54. Naresh deposited a sum of Rs. 10,000 at 10% rate of interest per annum, compounded annually. The total amount received by Naresh after 2 years is:

(a) Rs. 12,010
(b) Rs. 12,200
(c) Rs. 12,000
(d) Rs. 12,100

Q55. Seven businessmen, G, H, I, J, K, L and M, travelled in the same month on different dates 4^(th), 8^(th), 11^(th), 14^(th), 17^(th), 22^(nd) and 28^(th) (but not necessarily in the same order). L travelled the last. K travelled just after I but before J. K travelled on the 11^(th),Only two people travelled between K and M. Exactly one person travelled between G and K, and K travelled after G. On which date did M travel?

(a) 28th
(b) 17th
(c) 4th
(d) 22nd

Q56. As of the year 2021, which of the following states/union territories produces the largest quantity of apples?

(a) Jammu & Kashmir
(b) Ladakh
(c) Himachal Pradesh
(d) Uttarakhand

Q57. Radhika moves 30 metres in West direction. Then she turns to her right and moves 10 metres and then she turns to her left and moves 30 metres. In which direction is she now from the starting point?

(a) East
(b) South
(c) North-East
(d) North-West

Q58. As per National Statistics office, the work population ratio (WPR) in India is at _____ for july 2020 - June 2021.

(a) 39.8%
(b) 35.6%
(c) 45.7%
(d) 49.1%

Q59. If the sum of the LCM and the HCF of two numbers is 1050 and if their HCF is 630 less than their LCM, then the product of those two numbers is _____.

(a) 630000
(b) 176400
(c) 10500
(d) 661500

Q60. When an object is kept at the centre of curvature of a concave mirror, the image will be formed at:

(a) the centre of curvature
(b) infinity
(c) the position behind the mirror
(d) the principal focus

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Q61. A's age is seven times B's age. If the sum of their ages is 48 years, then their ages are:

(a) 35 and 5
(b) 42 and 6
(c) 40 and 8
(d) 46 and 6

Q62. In this question, a statement is followed by four conclusions. Find out which conclusion is true based on the given statement.

Statement:

$I \geq R > U \leq T > Q \geq O$

Conclusions:

1. $I > U$
2. $O > T$
3. $R > T$
4. $U < Q$

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

Q63. Which of the following is related to the Chipko Andolan Movement?

(a) Pollution
(b) Coal
(c) Water
(d) Forest

Q64. Which was the first microfinance institution in the country to win a bank license in 2014 by RBI?

(a) Madura Micro Finance Ltd
(b) Bandhan Financial Services Pvt Ltd
(c) Annapurna Financial Services Pvt Ltd
(d) BSS Microfinance Bangalore Pvt Ltd

Q65. The position of how many letters will remain unchanged if each of the letters in the word ARGUMENT is arranged in alphabetical order?

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

Q66. Which of the following is India's coldest inhabited place?

(a) Jammu
(b) Drass
(c) Shimla
(d) Mount Abu

Q67. The Swaminarayan Sampraday was established by Bhagwan Swaminarayan over 200 years ago in the present day state of _____.

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

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Q68. When zinc granules react with dilute sulphuric acid, a colourless gas is produced which burns with a _____.

(a) pop sound
(b) yellow flame
(c) green flame
(d) reddish flame

Q69. If 5^(n+2) = 3125, then n = _____.

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

Q70. Amongst six friends P, Q, R, S, T and U, each has a different height. R is taller than only two other friends. T is shorter than only one friend. Q is shorter than R but taller than P. S is shorter than U. Who is the second tallest among all the friends?

(a) T
(b) R
(c) U
(d) S

Q71. What is the full form of UNEP.

(a) United Nations Educational Programme
(b) United Nations Empowerment Programme
(c) United Nations Environmental Protection
(d) United Nations Environment Programme

Q72. Three statements are given, followed by three conclusions numbered I, II and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

1. All statements are books.

2. Some books are copies.

3. No copy is a thesaurus.

Conclusions:

I. Some thesauruses are copies.

II. No statement is a thesaurus.

III. Some books are statements.

(a) Only conclusions III follows
(b) Only conclusions II and III follow
(c) Only conclusions I and II follow
(d) Only conclusion I follows

Q73. The refractive index of fluid A is 1.47. This means _____.

(a) the speed of light in fluid A is 1.47 times greater than the speed of light in air.
(b) the speed of light in fluid A is increased 1.47 times than the speed of light in water
(c) the speed of light in fluid A is 1.47 times greater than the speed of light in water.
(d) the speed of light in fluid A is reduced by 1.47 times than the speed of light in vacuum

Q74. Select the option that is related to the fifth number in the same way as the second number is related to the first number and the fourth number is related to the third number.

18 : 36 :: 42 : 51 :: 25 : ?

(a) 48
(b) 41
(c) 45

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(d) 43

Q75. Which of the following numbers will replace the question mark (?) in the given series?

22, 34, 48, 64, 82, ?

(a) 102
(b) 101
(c) 98
(d) 100

Q76. Study the following table and answer the question.

Name of the Students	Marks		
English	Maths	Computer	
Arav	74	82	72
Toshita	71	92	49
Pranay	59	65	66
Vibhor	81	78	82

By what percentage is the total marks of Arav in the three subjects more than the total marks of Pranay in the three subjects?

(a) 24%
(b) 23%
(c) 27%
(d) 20%

Q77. Where can a tall tree store its waste products?

(a) In the bark tissue
(b) In old roots
(c) In intercellular spaces
(d) In old xylem (heartwood)

Q78. The average of the numbers 15, 17, 20, 25, 32 and 35 is:

(a) 14
(b) 28
(c) 18
(d) 24

Q79. In December 2021 to improve the leadership skills of grassroot women political leaders, which of the following organisations launched a pan-India capacity building programme called ‘She is a Changemaker’ for women representatives at all levels?

(a) National Human Rights Commission
(b) National Commission for Backward Classes
(c) National Commission for Women
(d) National Commission for Minorities

Q80. The total surface area (in m^2) of a cube, each of whose edges measures 4 m, is:

(a) 108
(b) 64
(c) 96
(d) 72

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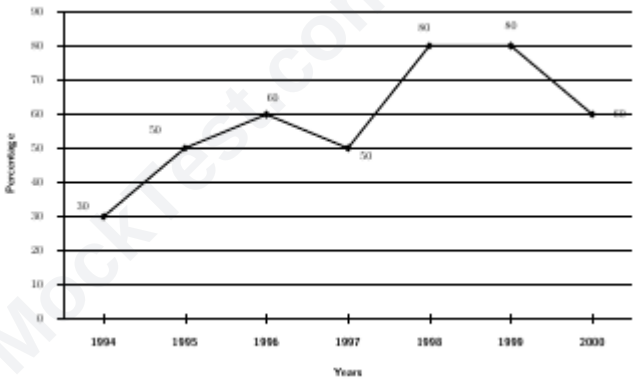
Q81. Which of the following compounds is formed when lead nitrate is mixed with potassium iodide?

(a) Lead carbide
(b) Lead iodide
(c) Lead nitride
(d) Lead oxide

Q82. Gurpurab is one of the holiest festivals of Sikhism, celebrated to commemorate the birth anniversary of:

(a) Guru Nanak Dev
(b) Guru Amar Das
(c) Guru Tegh Bahadur
(d) Guru Gobind Singh

Q83. The percentages of people qualifying for the driving test to get a license in different years are shown in the following graph. Study the graph and answer the question.



In the years 1996 and 1997 together, 45,000 people qualified for the driving test. If in the year 1996, a total of 25,000 people took the driving test, then how many people took the test in the year 1997?

(a) 70,000
(b) 60,000
(c) 30,000
(d) 45,000

Q84. In which season would sugar stored in root or stem tissue be transported to the buds which need energy to grow in plants?

(a) Winter
(b) Summer
(c) Spring
(d) Monsoon

Q85. What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and also '×' and '÷' are interchanged?

4 ÷ 4 - 45 × 5 + 12 = ?

(a) 28
(b) 35
(c) 13
(d) 15

Q86. Which of the following Five-Year Plans was based on the Mahalanobis model?

(a) Second Five-Year Plan
(b) Third Five-Year Plan
(c) First Five-Year Plan
(d) Fourth Five-Year Plan

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Q87. Which of the following numbers will replace the question mark (?) in the given series?

9, 13, 22, 38, 63, ?

(a) 99
(b) 100
(c) 72
(d) 63

Q88. What happens when quick lime reacts vigorously with water?

(a) Dissociation reaction
(b) Double displacement reaction
(c) Exothermic reaction
(d) Displacement reaction

Q89. Find the value of 3^(-5) × 4^(-5) × 5^(-5).

(a) 1 over 30^5
(b) 1 over 40^5
(c) 1 over 60^5
(d) 1 over 50^5

Q90. In 2022 scientists from which campus of the Indian Institute of Science Education and Research (IISER) have successfully extracted more than 95 percent of the uranium from natural seawater during an experiment?

(a) Bhopal
(b) Tirupati
(c) Mohali
(d) Pune

Q91. By which year does the National Education Policy 2020 aim for a 100% Gross Enrolment Ratio (GER) in school education?

(a) 2030
(b) 2023
(c) 2025
(d) 2027

Q92. A diver rowing at the speed of 3 km/h in still water takes double the time going 50 km upstream compared to going 50 km downstream. The speed of the stream is:

(a) 4 over3 km/h
(b) 1 km/h
(c) 3 km/h
(d) 7 over3 km/h

Q93. When magnetic lines of forces are more crowded in the region of magnetic field, this indicates the presence of:

(a) magnetic south pole alone
(b) weak magnetic field
(c) magnetic north pole alone
(d) strong magnetic field

Q94. The _____ range is bounded by the Satpura range on the south and the Aravalis on the northwest.

(a) Vindhyan
(b) Kailash
(c) Shivalik
(d) Gir

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Q95. Read the given statement and the arguments carefully and select the appropriate answer from the given options.

Statement:

All zoos should be banned except for endangered species of animals.

Arguments:

I. Animals are not for human entertainment but for coexistence with humans.

II. Endangered species need our concern to maintain an ecological balance.

(a) Both I and II strengthen the statement.
(b) II weakens while I strengthens the statement.
(c) Both I and II weaken the statement.
(d) I weakens while II strengthens the statement.

Q96. Who was the Chairman of the Drafting Committee which had the task to prepare the draft of the Constitution?

(a) N Goipalswami
(b) Alladi Krishnaswami Ayyas
(c) Dr. BR Ambedkar
(d) Saijio Mola Saadulla

Q97. If two parallel lines are intersected by a transversal, then the internal bisectors of two pairs of interior angles necessarily enclose a _____.

(a) square
(b) rectangle
(c) triangle
(d) circle

Q98. The rules of inheritance of traits in human beings are related to certain facts mentioned below. All of them are correct except one. Select the INCORRECT option.

(a) Each trait can be influenced by paternal and maternal DNA
(b) For each trait, there would be two versions in each child
(c) For each trait, there would be a single version in each child.
(d) Both mother and father contribute equal amount of genetic material to the child

Q99. In the year 2021, the Indian men's hockey team defeated which country to win the bronze medal in Tokyo Olympics?

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

Q100. When a beam of light of Wave lengths 4500 Å, 5400 Å, and 6000 Å respectively are passed through a prism then the angle of deviation is:

(a) more in light of 6000 Å
(b) more in light of 5400 Å
(c) equal in all
(d) more in light of 4500 Å

ANSWER KEY

1	b	2	d	3	c	4	c	5	a	6	d	7	d	8	a	9	a	10	c
11	c	12	a	13	a	14	c	15	b	16	c	17	d	18	a	19	d	20	b
21	b	22	c	23	d	24	b	25	b	26	b	27	b	28	d	29	b	30	b
31	d	32	c	33	b	34	c	35	a	36	c	37	d	38	d	39	c	40	a
41	c	42	b	43	a	44	c	45	d	46	a	47	a	48	a	49	c	50	c
51	b	52	c	53	c	54	d	55	d	56	a	57	d	58	a	59	b	60	a

61	b	62	a	63	d	64	b	65	c	66	b	67	c	68	a	69	b	70	a
71	d	72	a	73	d	74	d	75	a	76	d	77	d	78	d	79	c	80	c
81	b	82	a	83	b	84	c	85	c	86	a	87	a	88	c	89	c	90	d
91	a	92	b	93	d	94	a	95	a	96	c	97	b	98	c	99	c	100	d

SOLUTIONS

Q1. Answer: (b) 2000

The correct answer for this is 2000 km.

Key Points

• Kavach

• To increase the safety of moving trains, Indian Railways created the Automatic Train Protection (ATP) system known as Kavach.

• KAVACH is an indigenous train protection system that was created by the Research Design and Standards Organization (RDSO) in collaboration with three Indian manufacturers.

• By preventing Signal Passing at Danger (SPAD) and excessive velocity, KAVACH will assist Loco Pilot. Additionally, it will make it possible for the trains to run in adverse conditions like a thick fog.

• In the event that the Loco Pilot fails, it automatically applies the brakes to manage the train's speed.

Additional Information

• This technology's development has cost a total of Rs. 16.88 crores thus far. Kavach is responsible for over 1,098 kilometres of the South Central Railway's network route.

• Indian Railway tested Kavach on the absolute block portion of the South-Central Railway's Lingamapalli-Vikarabad-Wadi, Vikarabad-Bidar (250 KM) segment. Three vendors received approval for developmental orders on Indian Railways following the satisfactory conclusion of trials.

• The South-Central Railway's Manmad - Mudkhed - Dhone - Guntakal & Bidar - Parbhani segment is now working on a Kavach project spanning 1199 kilometres after a successful trial.

• Currently, the sections of New Delhi-Howrah and New Delhi-Mumbai are scheduled for the Kavach rollout, with completion dates of March 2024.

Q2. Answer: (d) 84 kg

Shortcut Trick

Weight of the new man = Weight of the replaced person + (Total persons × Increase in average)

=> Weight = 72 + (6 × 2)

=> Weight = 72 + 12 = 84 kg

Therefore The correct answer is 84 kg.

Alternate Method

Given:

Total number of persons = 6

Weight of the person leaving = 72 kg

Average weight increase = 2 kg

Formula Used:

Total Increase in Weight = Number of persons × Increase in average

Weight of New Person = Weight of replaced person + Total Increase

Calculations:

=> Total weight of the group increases because the new man is heavier than the person who left.

=> Net increase in total weight = 6 × 2 = 12 kg

=> Weight of the new man = 72 kg + 12 kg

=> Weight of the new man = 84 kg

Therefore The correct answer is 84 kg.

Additional Information

General Replacement Rule

When one item is replaced, the new value is calculated as: New = Old ± (Total Count × Change in Average). Use '+' for increase and '−' for decrease.

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Average Concept

The average is the central value of a set of data, calculated as (Sum of all observations) ÷ (Total number of observations).

Net Deviation

The sum of deviations of all values in a data set from their arithmetic mean is always zero. This principle is often used to solve complex average problems quickly.

Q3. Answer: (c) Rs. 0.50

Shortcut Trick

Selling Price (SP) of 10 pens = Rs. 7

SP of 1 pen = 7 ÷ 10 = Rs. 0.70

Profit = 40%

Multiplier: SP = CP × (100 + P%) ÷ 100

0.70 = CP × (140 ÷ 100) => CP = 0.70 × (100 ÷ 140) = 0.70 ÷ 1.4 = Rs. 0.50

Therefore The correct answer is Rs. 0.50.

Alternate Method

Given: Number of pens = 10, Total SP = Rs. 7, Profit% = 40%.

Formulas: CP = [SP ÷ (100 + Profit%)] × 100

=> Selling Price of one pen = 7 ÷ 10 = Rs. 0.70

=> Let the Cost Price (CP) of one pen be x.

=> x + 40% of x = 0.70

=> 1.4x = 0.70

=> x = 0.70 ÷ 1.4 = 0.5

Therefore The correct answer is Rs. 0.50.

Additional Information

Cost Price and Selling Price

The price at which an article is purchased is called its Cost Price (CP) and the price at which it is sold is its Selling Price (SP).

Profit Percentage

Profit% is always calculated on the Cost Price unless specified otherwise. Formula: Profit% = (Profit ÷ CP) × 100.

Q4. Answer: (c) 1872

The correct answer is 1872.

Key Points

• Chemist and inventor Dmitri Ivanovich Mendeleev was from Russia. His most famous works are the Periodic Law and a modified periodic chart of elements. The first periodic table was created by Mendeleev, and printed in 1869.

• In order to represent similarities and patterns in the behaviour of elements, Mendeleev created the periodic table, which is an arrangement of elements in an increasing atomic mass order in tablet form.

• In the periodic table, the elements were arranged into 7 Horizontal rows in ascending order of atomic known as periods and 8 vertices column known as groups.

• When two elements are highly similar to one another, the new element is positioned immediately below the older element that shares the same characteristic to begin a new period. Lithium, potassium, rubidium, and other first-group elements are some examples.

• One period below the other creates a "column" (group). Thus, the horizontal rows and vertical columns, or the periods and groups, respectively, make up Mendeleev's periodic table.

• If two elements are similar but not by much, they are separated by being placed below but somewhat distant from one other. Each column will contain two sub-columns (A and B), allowing for more similarity between entries inside each sub-column.

• Transitional elements are categorised into group VIII, while normal elements are divided into groups I through VII.

• Group VIII consists of three parts, while Groups I through VII is split into two subgroups.

• The first series and the second series are separated into the fourth through seventh grades.

Additional Information

Difference between the Modern periodic table and Mendeleev's periodic table -

Mendeleev's periodic table	Modern periodic table
Atomic mass is the foundation of Mendeleev's periodic table.	The atomic number is the foundation of the current periodic table.

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Around 63 elements can be found in Mendeleev's periodic table.	There are approximately 118 elements in the current periodic table.
Mendeleev's periodic chart contained gaps for elements that had not yet been identified	The periodic table of today keeps its homogeneity.
Noble gases were not included in Mendeleev's periodic chart (as they are not discovered at that time).	Group 18 on the modern periodic table is a separate category for noble gases.
Transitional elements are listed with other elements in Mendeleev's periodic table	Transitional elements are arranged in a separate blocks in the modern periodic table.

Q5. Answer: (a) Only conclusions II, III and IV follow

Statement:

1. Some pants are coats.

2. All coats are red.

3. All red are shirts.

Venn Diagram:

Conclusions:

I. All pants are shirts. → False (Some pants are coats and all coats are shirts but we do NOT have a direct relation between pants and shirts so we can't conclude that all pants are shirts)

II. All coats are shirts. → True (Since we have All coats are red and All red are shirts, so we can say that All coats are shirts)

III. Some red are coats. → True (Since All coats are red so we can say that Some red are coats)

IV. Some shirts are pants. → True (Since we have All coats are shirts and some pants are coats so we can say that Some shirts are pants)

According to the diagram, conclusions II, III, and IV follow.

Hence, the correct answer is option 1).

Q6. Answer: (d) Rishabhanatha

The correct answer is Rishabhanatha.

Key Points

• Tirthankara of Jainism

• In Jainism, a Tirthankara is a saviour and divine guide on the dharma (righteous path).

• The word "Tirthankara" refers to the creator of a "samsara," or fordable route through the sea of limitless births and deaths.

• According to Jains, a Tirthankara is a person who, by himself, has conquered "samsara," the cycle of rebirth and death, and created a way for others to follow.

• The Tirthankara attains "Kevala Jnana" after realising his or her actual nature as spirit or self.

• Rishabhanatha is the first Tirthankara ("ford-maker") of Jainism and the creator of the Ikshvaku dynasty born to king Nabhi Raja and Queen Marudevi at Ayodhya

• Abhadeva, Rishabhadeva, and Abha are other names for Rishabhanatha.

• According to Jain tales, he lived millions of years ago.

Additional Information

Tirthankara Name	Symbol	Colour	Place of birth
Neminath (third last Tirthankara of Jainism; 22)	Shanka	Black	Darwka
Pashvanath (Second last Tirthankara of Jainism; 23)	Snake	Blue	Kashi
Vardhaman Mahavira (Last Tirthankara of Jainism; 24)	Lion	Golden	Kshatriyakund

Q7. Answer: (d) B

Given series:

(Left) A D 4 F @ T 5 H $ B R @ V T 6 # 7 H 6 D 8 $ % & G $ 3 C F (Right)

When all the symbols are dropped from the series,

Ninth to the left of fifth from the right → This means 14^(th)position to left from the right end.

(Left) A D 4 F T 5 H B R V T 6 7 H 6 D 8 G 3 C F (Right)

The letter 'B' is ninth to the left of fifth from the right.

Hence, the correct answer is option 4).

Q8. Answer: (a) C3H7OH

The correct answer is C3H7OH.

Key Points

Alcohols

• C_nH_(2n+1)OH is the general molecular formula of the homologous sequence of alcohols.

• Given carbon with one, two, and four atoms which are in homologous series, so left out is 3 atoms of carbon.

• The Formula containing 3 molecules of Carbon is C3H_(2*)_(3+1)OH which is C3H_(6+1)OH, yielding C3H7OH.

• So the answer is C3H7OH.

Additional Information

• An organic molecule known as alcohol has a saturated carbon atom linked to at least one hydroxyl (OH) functional group.

• The principal alcohol is ethanol (also known as ethyl alcohol), which is used as a narcotic.

• Ethanol is the main alcohol found in alcoholic beverages.

Q9. Answer: (a) 88

Shortcut Trick

Ratio of the two numbers = 1 : 3/2 = 2 : 3.

Let the common ratio factor be k. Then the numbers are 2k and 3k.

Product of numbers = HCF × LCM => (2k) × (3k) = 44 × 264.

$6k^2 = 44 \times 264 \Rightarrow k^2 = 44 \times 44 = 1936$.

$k = \sqrt{1936} = 44$.

Smaller number = 2k = 2 × 44 = 88.

Therefore The correct answer is 88.

Alternate Method

Given:

HCF of two numbers = 44

LCM of two numbers = 264

One number (N1) = 3/2 × Other number (N2)

Formula Used:

Product of two numbers = HCF × LCM

Calculations:

=> Let the smaller number be x. Then the larger number is (3/2)x.

=> $x \times (3/2)x = 44 \times 264$

=> $(3/2)x^2 = 11616$

=> $x^2 = (11616 \times 2) \div 3$

=> $x^2 = 3872 \times 2 = 7744$

=> $x = \sqrt{7744}$

=> x = 88

The numbers are 88 and (3/2) × 88 = 132.

Therefore The correct answer is 88.

Additional Information

Fundamental Relation

For any two positive integers a and b, Product (a × b) = HCF(a, b) × LCM(a, b).

HCF and Co-primes

If the HCF of two numbers is H, the numbers can be represented as Hx and Hy, where x and y are co-prime integers.

LCM in terms of HCF

The Least Common Multiple (LCM) is always divisible by the Highest Common Factor (HCF). LCM = HCF × x × y.

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Q10. Answer: (c) Squamous

The correct answer is the squamous epithelium.

Key Points Squamous epithelium

• Squamous epithelial cells are flat, spherical, and have a tiny nucleus in the middle.

• These are also known as Alveolar cells, which line the walls of the alveoli.

• The diffusion of gases in the lungs is best accomplished by this single layer of squamous cells.

• The presence of tightly packed cells with a single nucleus positioned on the basement membrane defines the cells.

Squamous epithelium

Additional Information

• Simple columnar to cuboidal epithelium lines the bronchioles.

• Thin squamous epithelium lines the alveoli, allowing for gas exchange.

Q11. Answer: (c) 70

Given:

Symbol	Meaning
•	•
•	×
×	÷
÷	•

We substitute the values in the given equation and solve it using BODMAS rule:

Substituting the symbols, as per the above table,

=> 76 - 5 × 6 ÷ 3 + 4

=> 76 - 5 × 2 + 4

=> 76 - 10 + 4

=> 80 - 10

=> 70

Hence, the correct answer is option 3.

Q12. Answer: (a) 36√6 m²

Shortcut Trick

Sum of ratio parts = 7 + 5 + 4 = 16 units

16 units = 48 m → 1 unit = 3 m

Sides are a = 21 m, b = 15 m, c = 12 m

Semi-perimeter (s) = 24 m

Area = √(24 × 3 × 9 × 12) = √(24 × 324 × 3) = 36√6 m²

Therefore The correct answer is 36√6 m².

Alternate Method

Given: Ratio of sides = 7 : 5 : 4 and Perimeter = 48 m

Formula Used: Heron's Formula Area = √[s(s−a)(s−b)(s−c)] where s = (a+b+c)/2

=> Let the sides be 7x, 5x, and 4x

=> 7x + 5x + 4x = 48

=> 16x = 48 => x = 3

=> Sides are a = 21 m, b = 15 m, c = 12 m

=> Semi-perimeter s = 48 / 2 = 24 m

=> Area = √[24 × (24−21) × (24−15) × (24−12)]

=> Area = √[24 × 3 × 9 × 12]

=> Area = √[2 × 12 × 3 × 9 × 12] = 12 × 3 √[2 × 3] = 36√6 m²

Therefore The correct answer is 36√6 m².

Additional Information

Heron's Formula

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Used for finding the area of any triangle when all three sides are known: Area = √[s(s−a)(s−b)(s−c)].

Equilateral Triangle Area

For a triangle with all sides equal to 'a', Area = (√3 / 4) × a².

Right-Angled Triangle Area

When base 'b' and height 'h' are perpendicular, Area = 1/2 × b × h.

Q13. Answer: (a) is parallel to principal axis of concave mirror

The correct answer is parallel to the principal axis of the concave mirror.

Key Points Concave mirror

• The reflective surface of a concave mirror is curled inward and away from the light source.

• Light is reflected inward to a single focal point via concave mirrors.

• A concave mirror, also known as a converging mirror, has an inwardly depressed reflecting surface.

Additional Information

In the case of concave mirrors, rays parallel to the principal axis converge and meet at the focus.

Q14. Answer: (c) 9785

Shortcut Trick

Apply the identity (a − b)(a + c) or (x + a)(x + b) where x = 100.

95 × 103 = (100 − 5) × (100 + 3)

=> 100² + (3 − 5) × 100 + (−5 × 3)

=> 10000 − 200 − 15 = 9785

Therefore The correct answer is 9785.

Alternate Method

Given: 95 × 103

Formula Used: Algebraic identity (x + a)(x + b) = x² + (a + b)x + ab

=> Let x = 100, a = −5, and b = 3.

=> 95 × 103 = (100 − 5)(100 + 3)

=> (100)² + (−5 + 3)(100) + (−5 × 3)

=> 10000 + (−2)(100) − 15

=> 10000 − 200 − 15

=> 9800 − 15

=> 9785

Therefore The correct answer is 9785.

Additional Information

BODMAS Rule

Always follow the order of Brackets, Orders, Division, Multiplication, Addition, and Subtraction for complex calculations.

Square of Numbers near 100

For (100 ± x)², the result is 100 ± 2x | x². For example, 103² = 10609.

Distributive Property

The property a(b + c) = ab + ac helps in breaking down large multiplications into simpler parts.

Q15. Answer: (b) • > % ^ = $ + *

Given word: 'ACQUIRED'

Letters	D	C	U	Q	I	A	R	E
Codes	@		^	%	=	#	$	•

Conditions:

i. If the first letter of the word is a vowel and last letter is a consonant, then both these letters will be coded as '*'.

ii. If the second letter of the word is a vowel and the fifth letter is a consonant, then both these letters will be coded as '&'.

Here, the first letter 'A' is a vowel and the last letter 'D' is a consonant therefore the first condition follows.

So the code for the word is,

A => *, C => >, Q => %, U => ^, I => =, R => $, E => +, D => *

Thus, the code for the word 'ACQUIRED' is >%^=$+.

Hence, the correct answer is option 2).

Q16. Answer: (c) dcbaca

Given series:

_ _b a d c _ _ d _ b a d c b _

Checking the options:

1. dcbaac → d c b a d c b a d a b a d c b c → doesn't follow any pattern.
2. cdabca → c d b a d c a b d c b a d c b a → doesn't follow any pattern.
3. dcbaca → d c b a d c b a d c b a d c b a → this follows the pattern and a repeating sequence is developed.
4. dbcaca → d b b a d c c a d c b a d c b a → doesn't follow the pattern.

Hence, the correct answer is option 3.

Q17. Answer: (d) 1

The given letter clusters are,

AIN, ONK, AST, EJO

When each letter is changed to the next letter in the English alphabetical order, the words formed are

BJO, POL, BTU, FKP

From the above words, only one word doesn't have a vowel.

Hence, the correct answer is option 4).

Q18. Answer: (a) Z

Given,

U, V, W, X, Y, and Z live on different floors of the same building.

Step 1: The lowermost floor in the building is numbered 1, the floor above it is numbered 2, and so on till the topmost floor is numbered 6.

Floor	Persons
6	
5	
4	
3	
2	
1	

Step 2: a) Z lives on the floor immediately above Y

b) W lives immediately above Z and immediately below V.

Floor	Person Case-I	Person Case-II	Person Case-III
6	V		
5	W	V	
4	Z	W	V
3	Y	Z	W
2		Y	Z
1			Y

Step 3): Only one person lives between U and V.

Floor	Person
6	U
5	X
4	V

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3	W
2	Z
1	Y

According to the arrangement, Z lives on the second floor.

Hence, the correct answer is option 1).

Q19. Answer: (d) Both the statements are false.

The correct answer is Both statements are false

Key Points

• Properties of metals

• The metals high up in the reactivity series are very reactive.

• Reactivity series refer to the metal series in which metals are arranged according to their reactivity from highest to lowest. It is also known as activity series which is used to predict whether a metal can displace another metal in a displacement reaction or not. This is a series in descending order of the reactivity of metals.

• The metals at the top of the reactivity series are powerful reducing agents so they are easily oxidized. These metals corrode very easily.

• Metals that are placed higher on the reactivity series have the ability to displace metals that are placed lower from their salt solutions.

• Higher-ranking metals require greater amounts of energy for their isolation from ores and other compounds.

Additional Information

• Metallic behaviour

• The metals high up in the reactivity series can not be obtained from their compounds by heating with carbon since these metals have more affinity for oxygen than carbon

• The oxides of very reactive metals cannot be reduced with carbon cause these metals have more affinity (more attraction) for oxygen than carbon. So carbon is unable to remove oxygen from these metal oxides and hence cannot convert them into free metals.

• The highly reactive metals are extracted by the electrolytic reduction of their molten chloride. During electrolysis, the electric current passes through an ionic substance in a molten or dissolved state causing the electrodes to react chemically and the materials to decompose.

Q20. Answer: (b) 900°

Shortcut Trick

For any polygon with n sides, the sum of all interior angles is given by (n − 2) × 180°.

A heptagon has 7 sides (n = 7).

Sum = (7 − 2) × 180°

Sum = 5 × 180° = 900°

Therefore The correct answer is 900°.

Alternate Method

Given:

Geometric Shape = Heptagon

Number of sides (n) = 7

Formula Used:

Sum of interior angles of a polygon = (n − 2) × 180°

Calculations:

=> A heptagon is a polygon with 7 vertices and 7 sides.

=> By applying the interior angle sum theorem:

=> Sum = (n − 2) × 180°

=> Sum = (7 − 2) × 180°

=> Sum = 5 × 180°

=> Sum = 900°

Therefore The correct answer is 900°.

Additional Information

Sum of Exterior Angles

For any convex polygon, the sum of all exterior angles is always equal to 360°.

Individual Interior Angle (Regular Polygon)

For a regular polygon, each interior angle is calculated as [(n − 2) × 180°] ÷ n. For a regular heptagon, this is 900° ÷ 7 ≈ 128.57°.

Number of Diagonals

The number of diagonals in a polygon with n sides is given by [n × (n − 3)] ÷ 2. For a heptagon, it is [7 × 4] ÷ 2 = 14 diagonals.

Q21. Answer: (b) Rs. 13

Shortcut Trick

Compare the two sets: 2 plates + 3 spoons = Rs. 86 and 4 plates + 1 spoon = Rs. 112.

Double the first set: 4 plates + 6 spoons = Rs. 172.

Subtract the second set from this: (4P + 6S) − (4P + 1S) => 5 spoons = 172 − 112 = Rs. 60.

Cost of 1 spoon = 60 ÷ 5 = Rs. 12.

Cost of 1 plate from the second set => (112 − 12) ÷ 4 = Rs. 25.

Difference between plate and spoon = 25 − 12 = Rs. 13.

Therefore The correct answer is Rs. 13.

Alternate Method

Given:

Cost of 2 plates (P) and 3 spoons (S) = Rs. 86

Cost of 4 plates (P) and 1 spoon (S) = Rs. 112

Formula Used:

Elimination method for linear equations in two variables.

Calculations:

Let the cost of one plate be P and one spoon be S.

=> 2P + 3S = 86 → (i)

=> 4P + S = 112 → (ii)

Multiplying equation (i) by 2:

=> 2 × (2P + 3S) = 2 × 86

=> 4P + 6S = 172 → (iii)

Subtracting equation (ii) from equation (iii):

=> (4P + 6S) − (4P + S) = 172 − 112

=> 5S = 60

=> S = 60 ÷ 5 = Rs. 12

Substituting S = 12 in equation (ii):

=> 4P + 12 = 112

=> 4P = 112 − 12

=> 4P = 100

=> P = 100 ÷ 4 = Rs. 25

The difference between the cost of a plate and a spoon is:

=> Difference = P − S = 25 − 12 = Rs. 13

Therefore The correct answer is Rs. 13.

Additional Information

Linear Equations in Two Variables

Equations of the form ax + by = c represent straight lines. They can be solved using substitution, elimination, or cross-multiplication.

Elimination Method

A process where you multiply equations by constants to align coefficients of one variable, allowing its removal by addition or subtraction.

Cost-Price Logic

Total Price = (Quantity1 × Price1) + (Quantity2 × Price2). This is the base for solving such purchase-based word problems.

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Q22. Answer: (c) 6

According to the given Venn diagram,

No. of persons who are only Entrepreneurs = 12

No. of persons who are only Engineers = 20

No. of persons who are only Under 35 years = 10

No. of persons who are Engineer, Entrepreneurs, and under 35 years of age = 8

No. of persons who are Engineers and Entrepreneurs and not under 35 years of age = 7

No. of persons who are Entrepreneurs and under 35 years of age but not Engineer = 5

No. of persons who are under 35 years of age and Engineers but not an Entrepreneurs = 6

Hence, the correct answer is option 3).

Q23. Answer: (d) Because it is reduces oxygen carrying capacity of blood

The correct answer is Because it reduces the oxygen-carrying capacity of the blood.

Explanation:

• The haemoglobin in our blood takes oxygen to different parts of our body from the Lungs.

• The oxygen affinity of haemoglobin is less than that of CO affinity towards haemoglobin.

• When we inhale air polluted with carbon monoxide (CO), carbon monoxide (CO) will combine with haemoglobin, forming carboxyhemoglobin in the blood and Stopping oxygen transport.

• The binding of carbon monoxide to haemoglobin, forming carboxyhemoglobin, reduces the amount of oxygen available to the heart muscle and other tissues for synthesizing ATP.

• It is a pollutant for humans since it reacts with Haemoglobin. It is harmful when breathed since it displaces oxygen in the blood and deprives the heart, brain and other important organs.

Q24. Answer: (b) United states of America

The correct answer is the United States of America.

Key Points

• The American Constitution served as a model for the idea of judicial review.

• The Indian Constitution specifies the Supreme Court's judicial review authority in Articles 32 and 136 and the High Court's judicial review authority in Articles 226 and 227.

• Judicial review states that the court has the authority to examine rules and laws, determine whether they are constitutional, and also to invalidate them if they are found to be unconstitutional.

Additional Information

• The Weimar Constitution of Germany, which addressed the suspension of fundamental rights during a national emergency, served as the model for these clauses.

• The provisions relating to the Centre's residuary powers and the Centre's appointment of the Governors in the states were taken from Canada.

• The Russian Constitution, which the Soviet Union is today, is where the principles of fairness (social, economic, and political) in the Indian Preamble originated.

Q25. Answer: (b) Seven

Given:

A certain number of people are sitting in a row, facing North.

Step 1): P is an immediate neighbour of both V and T.

OR

Step 2): (a) R is an immediate neighbour of both T and Q.

(b) V is at the extreme right end.

(c) There are only two people on the left of Q.

According to the arrangement, seven persons are seated in a row.

Hence, the correct answer is option 2).

Q26. Answer: (b) 4

Shortcut Trick

Apply M1D1 = M2D2 directly.

16 × 5 = M2 × 20

80 = M2 × 20

M2 = 80 ÷ 20 = 4

Therefore The correct answer is 4 men.

Alternate Method

Given:

Number of men in first case (M1) = 16

Number of days in first case (D1) = 5

Number of days in second case (D2) = 20

Formula Used:

Total Work = Men × Days

M1D1 = M2D2

Calculations:

=> Total Work = 16 × 5 = 80 man-days

=> Required Men (M2) = Total Work ÷ D2

=> M2 = 80 ÷ 20

=> M2 = 4 men

Therefore The correct answer is 4 men.

Additional Information

General Work Formula

For varying efficiency and hours, use (M1D1H1E1)/W1 = (M2D2H2E2)/W2.

Inverse Proportion

The number of men is inversely proportional to the time taken to complete a constant piece of work.

Work and Wages

Wages are generally distributed in the ratio of the work done by each person.

Q27. Answer: (b) Nethra Kumanan

The correct answer is Nethra Kumanan.

Key Points

• Nethra Kumanan

• Nethra Kumanan, who was born on August 21, 1997, learned to sail in 2009 at a summer camp run by the Tamil Nadu Sailing Association. At the time, she was twelve.

• India was formerly represented by Nethra Kumanan at the 2014, and 2018 Asian Games, and the 2020 Sailing World Cup.

• Nethra Kumanan won a bronze medal in the 2020 Sailing World Cup in Miami, USA, becoming the first Indian woman to do so in sailing

Additional Information

• Tokyo Olympics 2021

• Due to the COVID-19 pandemic, the 2020 Summer Olympics, which were originally scheduled to take place from 24 July to 9 August 2021, were moved up a year to 2021.

• On July 23, 2021, at Tokyo's Olympic Stadium, Emperor Naruhito gave the opening address for the Tokyo Olympics.

• The theme of the Tokyo Summer Olympics in 2020 is "Moving Forward: Unified by Emotion."

Q28. Answer: (d) 16 2/3 % gain

Shortcut Trick

When the Cost Price of x articles equals the Selling Price of y articles:

Profit/Loss % = [(No. of CP articles − No. of SP articles) / No. of SP articles] × 100

Given: x = 42, y = 36

Profit % = [(42 − 36) / 36] × 100 = 6/36 × 100 = 1/6 × 100

Profit % = 16 2/3%

Therefore The correct answer is 16 2/3% gain.

Alternate Method

Given:

CP of 42 articles = SP of 36 articles

=> Let CP of 1 article = Rs. 1

=> CP of 42 articles = Rs. 42

=> Since CP of 42 = SP of 36, then SP of 36 articles = Rs. 42

=> CP of 36 articles = Rs. 36

=> Profit = SP of 36 − CP of 36

=> Profit = Rs. 42 − Rs. 36 = Rs. 6

=> Gain % = (Profit / CP) × 100

=> Gain % = (6 / 36) × 100 = 1/6 × 100

=> Gain % = 16 2/3%

Therefore The correct answer is 16 2/3% gain.

Additional Information

Profit and Loss Percentages

Profit % = (Profit/CP) × 100 and Loss % = (Loss/CP) × 100. Profit or loss is always calculated on the Cost Price unless specified otherwise.

Article Quantity Relationship

If CP of x = SP of y, the Profit % = (x − y)/y × 100. If the result is negative, it represents a Loss %.

Fraction to Percentage Conversion

Common fractions: 1/6 = 16.66% or 16 2/3%, 1/7 = 14.28% or 14 2/7%, 1/8 = 12.5%.

Q29. Answer: (b) FK

Given: 75#2

Number\ symbol	**•**	**2**	**@**	**5**	**^**	**•**	**7**	**#**	**%**	**9**
Letter code	J	P	A	F	D	N	R	K	M	Z

The code for 75#2

Here, the first element is an odd number, and the last, is an even number so the second conclusion follows.

In the given cluster,

7 - The odd number

2 - The even number

Therefore, condition (ii) is satisfied so, the first and last elements are to be coded as $.

Thus, the code for 75#2 is FK.

Hence, the correct answer is option 2).

Q30. Answer: (b) PESA Act 1996

The correct answer is PESA Act 1996.

Key Points

• PESA Act 1996

• Tribal communities that reside in Scheduled Areas have the legal right to rule themselves according to their own forms of self-government, which is recognized under the PESA Act.

• The Scheduled Area is not automatically covered by the legislation, hence the PESA Act was passed on the advice of the Bhuria Committee Report, which was submitted in 1995.

• The PESA Act was passed in December 1996 to allow Tribal Self Rule in the scheduled territories by extending the rules created by the 73rd constitutional amendment to those areas.

Additional Information

• Part IX of the constitution related to panchayats consists of articles 243 to 243-O.

• Article 243A: Gram Sabha

• At the village level, a Gram Sabha may exercise the authority and carry out the duties that a state's legislature may by law designate.

• Article 243B: Constitution of Panchayats

• In conformity with the guidelines in this Part, Panchayats at the village, intermediate, and district levels shall be established in each State

• Article 243C: Composition of Panchayats

• The Legislature of a State may, by law, establish rules regarding the makeup of Panchayats, provided that, to the greatest extent possible, there shall be uniformity throughout the State in the ratio between the population of a Panchayat's territorial area at any

level and the number of seats in such Panchayat to be filled by election.

Q31. Answer: (d) 855.00

Shortcut Trick

Ratio of parts = 5 : 3

Total ratio units = 5 + 3 = 8 units

8 units = Rs. 1,368 → 1 unit = 1368 ÷ 8 = Rs. 171

Greater part (5 units) = 5 × 171 = Rs. 855

Therefore The correct answer is Rs. 855.00.

Alternate Method

Given: Total amount = Rs. 1,368, Ratio = 5 : 3.

Formula: Value of a part = (Ratio of that part ÷ Sum of ratios) × Total Value

=> Sum of ratio parts = 5 + 3 = 8

=> Greater part corresponds to the ratio 5.

=> Value of greater part = (5 ÷ 8) × 1368

=> Value of greater part = 5 × 171

=> Value of greater part = Rs. 855

Therefore The correct answer is Rs. 855.00.

Additional Information

Ratio and Proportion

A ratio compares two quantities. If a total S is divided in ratio a:b, the parts are [a/(a+b)]×S and [b/(a+b)]×S.

Direct Proportion

When the total amount increases, the value of each individual part in the ratio increases proportionally.

Difference between parts

The difference between parts can be found directly using: Difference = [(a−b)/(a+b)]×Total.

Q32. Answer: (c) 174

Shortcut Trick

For any two consecutive natural numbers n and (n + 1), the number of non-square numbers between their squares is always 2n.

Here, n = 87 and n + 1 = 88.

Number of non-square numbers = 2 × 87 = 174.

Therefore The correct answer is 174.

Alternate Method

Given: Two consecutive squares 87^2 and 88^2.

Formula: Number of integers between a and b (where a) is (b − a) − 1.

=> $87^2 = 7569$

=> $88^2 = 7744$

=> Number of non-square numbers = (7744 − 7569) − 1

=> Number of non-square numbers = 175 − 1 = 174.

Therefore The correct answer is 174.

Additional Information

Consecutive Squares Property

There are 2n non-perfect square numbers between the square of n and (n + 1).

Difference of Squares

The difference between $(n + 1)^2$ and n^2 is always 2n + 1.

Sum of First n Odd Numbers

The square of any natural number n is equal to the sum of the first n odd natural numbers.

Q33. Answer: (b) Rs. 15,125

Shortcut Trick

Effective rate of compound interest for 2 years at 10% = 10% + 10% + (10 × 10) ÷ 100% = 21%

Total amount payable after 2 years = Principal × (100% + 21%)

=> Total Amount = 121% of 12500

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=> Total Amount = 1.21 × 12500 = 15125

Therefore The correct answer is Rs. 15,125.

Alternate Method

Given:

Principal (P) = Rs. 12,500

Rate of Interest (R) = 10% per annum

Time (n) = 2 years

Formula Used:

Amount (A) = $P \times (1 + R \div 100)^n$

Principal

Rs. 12,500

+10%

After 1st Year

Rs. 13,750

+10%

Final Amount

Rs. 15,125

Calculations:

=> $A = 12500 \times (1 + 10 \div 100)^2$

=> $A = 12500 \times (1 + 1 \div 10)^2$

=> $A = 12500 \times (11 \div 10)^2$

=> $A = 12500 \times (121 \div 100)$

=> $A = 125 \times 121$

=> $A = 15125$

Therefore The correct answer is Rs. 15,125.

Additional Information

Compound Interest Formula

$A = P(1 + R \div 100)^n$, where A is the total amount, P is the principal, R is the rate of interest, and n is the time period in years.

Effective Rate for 2 Years

The effective compound interest rate for 2 years at R% per annum is calculated directly using the successive percentage formula: $[2R + (R^2 \div 100)]\%$.

Difference Between CI and SI

For 2 years, the difference between Compound Interest and Simple Interest on a certain sum is calculated as $P(R \div 100)^2$.

Q34. Answer: (c) 6

Given:

√1296/√121 × 15/(216)^(1/3) × 11 over √225

Calculation:

As, we know that

=>$(36)^2 = 1296$, $11^2 = 121$, $6^3 = 216$, $15^2 = 225$

=> √(36 × 36)over √(11 × 11) × 15over cbrt(6^3) × 11over √(15 × 15)

=> (36 × 15 × 11)/(11 × 6 × 15)

=> 36/6 = 6

Hence, the correct answer is option 3.

Q35. Answer: (a) oic acid

The correct answer is oic acid.

Key Points

• Carboxylic acids have carbon particles and are called propanoic corrosive, from propane, the name for a three-carbon chain, with - oic corrosive, the postfix for this class of mixtures, added.

• The postfix of this carbon chain is then supplanted, as carboxylic acids generally end in "- oic corrosive." A model is CH2O2, in which the longest nonstop carbon chain is methane.

• The sub-atomic equation of propanoic corrosive is C3H6O2. This corrosive contains three carbon particles, six hydrogens, and

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two oxygens. The carbon particles are reinforced directly.

• Propionic corrosive, otherwise called propionate or methane carboxylic corrosive, is an individual from the class of mixtures known as carboxylic acids.

Additional Information

• This compound has a place with the class of natural mixtures known as carboxylic acids.

• Propane is a three-carbon alkane gas (C3H8). It is put away under tension inside a tank as a dismal, unscented fluid.

• As strain is delivered, the fluid propane disintegrates and transforms into gas that is utilized in the ignition.

• A prop is a recognizable term in the theater or film domain. Props are those items that an entertainer might deal with or control to satisfy the qualities or activities of a person.

Q36. Answer: (c) 32

The correct answer is 32.

Key Points

• The seventh time frame contains 32 components, tied for the most with period 6, starting with francium and finishing with oganesson, the heaviest component presently found.

• The all-out number of electrons that can be obliged in the seventh period is 2 (in 7s) + 14(in 5f) + 10(in 6d)+ 6(in 7p) = 32. The most extreme number of components present in it is 32.

• A period 7 component is one of the substance components in the seventh column (or time) of the occasional table of the compound components.

• Generally speaking, period 7 components fill their 7s shells first, then, at that point, their 5f, 6d, and 7p shells in a specific order, however, there are exemptions, like uranium.

Additional Information

• Francium has the substance image Fr and nuclear number 87.

• Radium (Ra, nuclear number 88), is a practically unadulterated white basic earth metal, however, it promptly oxidizes, responding with nitrogen (as opposed to oxygen) on openness to air, becoming dark in variety.

• The actinide or actinoid (IUPAC classification) series envelops the 15 metallic substance components with nuclear numbers from 89 to 103, actinium through lawrencium.

• Transactinide components are likewise transuranic components, that is to say, have a nuclear number more noteworthy than that of uranium (92), an actinide.

Q37. Answer: (d) 9 W

The correct answer is 9W.

Calculations:

Given:

P=36W,V=12V

Formula:

$P=(V^2)/R$

$R=(V^2)/P$

$R=(12^2)/36=144/36=4$ ohm

Now at 6V supply,

$P=(V^2)/R$

$P=(6^2)/4=36/4=9W$

Therefore the power consumed is 9W.

Q38. Answer: (d) Ritu

Given:

Step 1): Five persons are sitting in a straight row facing north.

Step 2): (a) Ram is sitting at the extreme left end

(b) Sita is sitting at the extreme right end of the row.

(c) Kamal sits exactly in the middle of the row.

Step 3: (a) Ravi is sitting exactly third to the left of Sita.

(b) Ritu is sitting exactly third to the right of Ram.

According to the arrangement, Ritu is the immediate neighbour of Sita.

Hence, the correct answer is option 4).

Q39. Answer: (c) Neena Gupta

The correct option is Neena Gupta.

Key Points

• Professor Neena Gupta, a mathematician at the Indian Statistical Institute in Kolkata, received the Ramanujan Prize for Young Mathematicians on February 22, 2022, in a virtual ceremony.

• The world's largest mathematical problem is said to be the Zariski Cancellation Issue, a fundamental algebraic geometry problem.

• Other awards received by Professor Neena Gupta:-

• The 2015 Ramanujan Prize from the Ramanujan Institute for Advanced Study in Mathematics.

• 2014 Young Scientists Award of the Indian National Science Academy for her work on the Zariski cancellation problem

• The inaugural Professor A. K. Agarwal Award from the Indian Mathematical Society in 2015.

• The 2017 B. M. Birla Science Prize in Mathematics.

Additional Information

• It is given in the honor of Srinivasa Ramanujan, a pure mathematics genius who largely learned the subject on his own and made outstanding contributions to the study of elliptic functions, continuous fractions, infinite series, and number theory.

• Sponsored and funded by

• DST (The Department of Science and Technology) of the Government of India.

• IMU (International Mathematical Union).

• ICTP (International Centre for Theoretical Physics)

• Eminent mathematicians were chosen for the Committee after discussions between the ICTP, the IMU, and the DST. The award's name was changed to the "DST-ICTP-IMU Ramanujan Prize in 2021.

• List of Ramanujan Prize winners (2005-2021)

YEAR	WINNER	YEAR	WINNER
2021	Neena Gupta (India)	2012	Fernando Codá Marques (Brazil)
2020	Carolina Araujo (Brazil)	2011	Philibert Nang (Gabon)
2019	Hoang Hiep Pham (vi) (Vietnam)	2010	Shi Yuguang (China)
2018	Ritabrata Munshi (India)	2009	Ernesto Lupercio (Mexico)
2017	Eduardo Teixeira (Brazil)	2008	Enrique Pujals (Argentina/Brazil)
2016	Chenyang Xu (China)	2007	Jorge Lauret (Argentina)
2015	Amalendu Krishna (India)	2006	Ramdorai Sujatha (India)
2014	Miguel Walsh (Argentina)	2005	Marcelo Viana (Brazil)
2013	Tian Ye (China)		

Q40. Answer: (a) 44.00%

Shortcut Trick

Savings percentage = (Savings ÷ Salary) × 100

Savings % = (88,000 ÷ 2,00,000) × 100

Savings % = 88 ÷ 2 = 44%

Therefore The correct answer is 44.00%.

Alternate Method

Given:

Total Salary = Rs. 2,00,000

Total Savings = Rs. 88,000

Formula: Percentage = (Part value ÷ Total value) × 100

=> Savings % = (88,000 ÷ 2,00,000) × 100

=> Savings % = 88,000 / 2,000

=> Savings % = 88 / 2

=> Savings % = 44%

Therefore The correct answer is 44.00%.

Additional Information

Income-Expenditure Relation

Income = Expenditure + Savings. This fundamental equation is used to find any missing component when two are known.

Expenditure Percentage

Expenditure % = (Expenditure ÷ Total Income) × 100 or simply (100% − Savings %).

Percentage Change

Percentage Increase/Decrease = (Difference ÷ Original Value) × 100.

Q41. Answer: (c) Rs. 215/-

The correct answer is option 3)Rs. 215/-

Given:

The power of the refrigerator is 350W operated for 8 hours/day, the TV set is rated as 150 W for 5 hours/day and for electric heater is rated as 1500 W for 30 minutes/day. The energy cost per unit is Rs. 5.00.

Formula:

Electrical energy, E=P*t where P is the power and T is the time taken.

Calculations:

Refrigerator:

t=8*10=80hours

P=350W=350/1000=0.35kW

So, E=0.35*80=28kWh

TV:

t=5*10=50hours

P=150W=150/1000=0.15kW

E=0.15*50=7.5kWh

Electric heater:

t=30min=1/2*10=5hours

P=1500W=1500/1000=1.5kW

E=1.5*5=7.5kWh

Total energy consumed is: E=28+7.5+7.5=43kWh

Thus, the cost is Cost=43*5=Rs. 215

Therefore the total expenditure of that house for 10 days for the TV set, refrigerator and electric heater will be Rs. 215/-

Q42. Answer: (b) Between E and F

Given:

Step 1): Six friends C, D, E, F, G, and H are sitting in a row facing north.

Step 2): (a) F is 2nd to the left of E

(b) E is 2nd to the left of G.

OR,

Step 3): (a) D is 2nd to the right of H

(b) H is an immediate neighbour of E and G.

According to the arrangement, C is sitting between E & F.

Hence, the correct answer is option 2).

Q43. Answer: (a) 1 : 4

The correct answer is option 1)1 : 4

Calculations:

Given:

Two wires are made up of the same material, but the ratio of their cross-sectional areas is 1 : 10 and the ratio of their lengths is 2 : 5 and have same voltage of 10V.

Formula:

Ohm's law: V=IR

Resistance: R=pl/A

As we know that R=pl/A we have for the wires:

R1/R2=l1/A1*A2/l2

R1/R2=l1/l2*A2/A1

R1/R2=2/5*10/1=4/1

Thus R1:R2 is obtained as 4:1.

But according to Ohm's law, we have current I is inversely proportional to resistance R.

Therefore, I1/I2=R2/R1=1/4

Thus, the ratio of current in the wires of the same material is 1:4.

Q44. Answer: (c) TJQ : WGT

The logic follows here is:

The first letter cluster is related to the second letter cluster in the following way:

and,

Similarly,

Thus, the letter cluster with the same logic is TJQ : WGT.

Hence, the correct answer is option 3).

Q45. Answer: (d) (52, 117, 65)

The logic followed here is:

2^(nd) number - 1^(st) number = 3^(rd) number

(OR)

2nd number - 3rd number = 1st number

(OR)

1st number + 2nd number = 3rd number

Given:

(76, 171, 95) → 171 - 76 = 95

and,

(28, 63, 35) → 63 - 28 = 35

By checking the options,

1) (44, 88, 55) → 88 - 44 ≠ 55

2) (60, 105, 70) → 105 - 60 ≠ 70

3) (24, 48, 30) → 48 - 24 ≠ 30

4) (52, 117, 65) →117 - 52 = 65

Hence, the correct answer is option 4.

Q46. Answer: (a) 12 km, North

Given,

Akshay starts from the restaurant and travels 2 km southwards and then turns right and travels 4 km. He then turns left and travels 10 km, then he turns left and travel 4 km to reach his home.

The direction & distance diagram is shown below:

According to the diagram, the shortest distance between the restaurant to home is 12 km and is to the North of his home.

Hence, the correct answer is option 1).

Q47. Answer: (a) P = (V²)/R

The correct answer is P = (V²)/R

Key Points

• Electric power is the rate at which work is done or energy is transformed into an electrical circuit.

• It is a Scalar quantity.

• The formula for electric power is given by, P=VI

• But, we know according to ohms law we have: V=IR

• So we have I=V/R

• Substituting, I in the power equation we have: P=(V*V)/R=(V²)/R

• Therefore, $P=(V^2)/R$.

Q48. Answer: (a) Kerala

The correct option is Kerala.

Key Points

• One of India's leading institutes for Sanskrit instruction, study, and invention is the Sree Sankaracharya University of Sanskrit (SSUS). In 1993, the University was established in Kalady, Kerala.

• Student percentage -

• Over 90% of the university's students and research scholars come from economically and socially underprivileged communities and families,

• More than 70% of the students are female.

• Nine regional centres -

• Kalady, Thiruvananthapuram, Thrissur, Panmana, Thuravoor, Ettumanoor, Tirur, Koyilandy, and Payyannur are the principal campuses.

• Location of the university -

• In order to serve students from disadvantaged backgrounds, the bulk of these campuses are located in rural areas of the State.

Additional Information

• Surabhi Lakshmi, a Malayalam actress, has won a National Film Award.

• Dileesh Pothan is a well-known director, actor, and producer in Malayalam cinema.

• Malayalam film music is composed by Arun Muraleedharan. Grace Antony, a cinema actress.

• Politician V. P. Sanu now serves as the Students' Federation of India's National President.

• Renu Soundar is a Malayalam television and film actress.

• Hima Shankar, an artist, works in both theatre and movies.

• Sneha Sreekumar, an Indian actress and dancer, appears in theatrical productions as well as Malayalam films and TV programmes.

Q49. Answer: (c) Lymph

The correct answer is Lymph.

Key Points

• Lymph is like the plasma of blood yet dull and contains less protein.

• Lymph conveys processed and consumed fats from the digestive system since fats are insoluble in the fluid mechanism of blood.

• The lymph contains lesser proteins since they have been separated by the kidneys and eliminated from the plasma.

• The quantity of proteins that got away from the vessels to tissue is exceptionally less.

Additional Information

• For sure, when contrasted and plasma, lymph is advanced with proteins of cells beginning to set free from the parenchyma.

• A sort of platelet that is made in the bone marrow and tracked down in the blood. Red platelets contain a protein called hemoglobin, which conveys oxygen from the lungs to all pieces of the body.

• The ordinary number of WBCs in the blood is 4,500 to 11,000 WBCs for each microliter (4.5 to 11.0 × 109/L). Typical worth reaches might fluctuate somewhat among various labs

• Their essential capability is to forestall and quit dying. On the off chance that a vein is harmed, the body conveys messages to platelets which make them travel to the harmed region.

Q50. Answer: (c) 85

Shortcut Trick

From the quadratic equation $x2 − 11x + 18 = 0$:

Sum of roots $(\alpha + \beta) = −(−11)/1 = 11$

Product of roots $(\alpha\beta) = 18/1 = 18$

Using the algebraic identity: $\alpha2 + \beta2 = (\alpha + \beta)2 − 2\alpha\beta$

$\Rightarrow \alpha2 + \beta2 = (11)2 − 2 × 18 = 121 − 36 = 85$

Therefore The correct answer is 85.

Alternate Method

Given:

Quadratic equation: $x2 − 11x + 18 = 0$

α and β are the roots of the equation.

Calculations:

Factorizing the given equation by splitting the middle term:

=> x2 − 9x − 2x + 18 = 0

=> x(x − 9) − 2(x − 9) = 0

=> (x − 9)(x − 2) = 0

=> The roots are x = 9 and x = 2.

Let α = 9 and β = 2.

We need to find the value of α2 + β2:

=> α2 + β2 = (9)2 + (2)2

=> α2 + β2 = 81 + 4

=> α2 + β2 = 85

Therefore The correct answer is 85.

Additional Information

Nature of Roots

The discriminant D = b2 − 4ac determines the nature of the roots. If D > 0, roots are real and distinct; if D = 0, roots are real and equal; if D < 0, roots are complex or imaginary.

Sum and Product of Roots

For a quadratic equation ax2 + bx + c = 0, the sum of the roots is given by −b/a and the product of the roots is c/a.

Algebraic Identities

Other useful identities for root manipulation: α3 + β3 = (α + β)3 − 3αβ(α + β) and (α − β)2 = (α + β)2 − 4αβ.

Q51. Answer: (b) 3

Given three-digit numbers series:

(Left) 653 831 933 476 715 (Right)

If 2 is added to the third digit of every number, the new number formed is shown below:

655 833 935 478 717

In the new number series 655, 833, and 717, are the numbers where the third digit can be exactly divided by the second digit of that number.

Hence, the correct answer is option 2).

Q52. Answer: (c) 81

Given:

88 × 22 - 15 ÷ 40 + 19 = ?

We substitute the values in the given equation and solve it using the BODMAS rule:

By decoding the equation,

Symbol	Meaning
•	•
•	×
×	÷
÷	•

Substituting the operators, we get,

=> 88 ÷ 22 × 15 + 40 - 19

=> 4 × 15 + 40 - 19

=> 60 + 40 - 19

=> 100 - 19

=> 81

Hence, the correct answer is option 3).

Q53. Answer: (c) 0

Shortcut Trick

Put θ = 45° as it is defined for all terms in the expression.

$\sec^2 45° + (\text{cosec}^2 45° - 1) - (1 + \tan^2 45°) - \cot^2 45°$

$\Rightarrow (\sqrt{2})^2 + ((\sqrt{2})^2 - 1) - (1 + 1^2) - 1^2$

$\Rightarrow 2 + (2 - 1) - (1 + 1) - 1 \Rightarrow 2 + 1 - 2 - 1 = 0$

Therefore The correct answer is 0.

Alternate Method

Given: $\sec^2 \theta + (\text{cosec}^2 \theta - 1) - (1 + \tan^2 \theta) - \cot^2 \theta$

Step 1: Simplify the terms inside the parentheses using standard identities.

$\Rightarrow \text{cosec}^2 \theta - 1 = \cot^2 \theta$

$\Rightarrow 1 + \tan^2 \theta = \sec^2 \theta$

Step 2: Substitute these simplified forms back into the main expression.

$\Rightarrow \sec^2 \theta + (\cot^2 \theta) - (\sec^2 \theta) - \cot^2 \theta$

Step 3: Cancel out the positive and negative terms.

$\Rightarrow (\sec^2 \theta - \sec^2 \theta) + (\cot^2 \theta - \cot^2 \theta)$

$\Rightarrow 0 + 0 = 0$

Therefore The correct answer is 0.

Additional Information

Fundamental Identities

There are three main Pythagorean identities: $\sin^2 \theta + \cos^2 \theta = 1$, $1 + \tan^2 \theta = \sec^2 \theta$, and $1 + \cot^2 \theta = \text{cosec}^2 \theta$.

Reciprocal Relations

The primary reciprocal functions are $\text{cosec}\ \theta = 1/\sin \theta$, $\sec \theta = 1/\cos \theta$, and $\cot \theta = 1/\tan \theta$.

Value Substitution Method

For identities that hold for all angles, choosing an easy angle (like 0, 45, or 90 degrees) where functions are defined is a fast way to eliminate options.

Q54. Answer: (d) Rs. 12,100

Shortcut Trick

Effective rate for 2 years at 10% compounded annually = 10 + 10 + (10 × 10)/100 = 21%

Total Amount = 100% (Principal) + 21% (Interest) = 121%

Amount = 121% of 10,000 = 1.21 × 10,000

Amount = Rs. 12,100

Therefore The correct answer is Rs. 12,100.

Alternate Method

Given:

Principal (P) = Rs. 10,000

Rate (R) = 10% per annum

Time (T) = 2 years

Formula Used:

Amount (A) = P × (1 + R/100)^T

Calculations:

$\Rightarrow A = 10,000 \times (1 + 10/100)^2$

$\Rightarrow A = 10,000 \times (1 + 0.1)^2$

$\Rightarrow A = 10,000 \times (1.1)^2$

$\Rightarrow A = 10,000 \times 1.21$

$\Rightarrow A = 12,100$

Therefore The correct answer is Rs. 12,100.

Additional Information

Compound Interest (CI) Formula

CI = Amount − Principal = P[(1 + R/100)^T − 1].

CI vs SI Difference (2 Years)

The difference between CI and SI for 2 years is given by: $D = P(R/100)^2$.

Effective Rate of Interest

For a rate R compounded annually for n years, the effective rate is $[(1 + R/100)^n - 1] \times 100$.

Q55. Answer: (d) 22nd

Given:

Seven businessmen, G, H, I, J, K, L and M, travelled in the same month on different dates 4th, 8th, 11th, 14th, 17th, 22nd and 28th.

Step 1): (a) K travelled on the 11th

(b) Only two people travelled between K and M.

(c) L travelled the last.

Dates	Businessman
4th	
8th	
11th	K
14th	
17th	
22nd	M
28th	L

Step 2): (a) Exactly one person travelled between G and K, and K travelled after G.

(b) K travelled just after I but before J.

| Dates | Businessman | | --- | --- | | 4th | G | | 8th | I | | 11th | K | | 14th | J | | 17th | H | | 22nd | M | | 28th | L |	**Dates**	**Businessman**	**4th**	**G**	**8th**	**I**	**11th**	**K**	**14th**	**J**	**17th**	**H**	**22nd**	**M**	**28th**	**L**
Dates	Businessman															
4th	G															
8th	I															
11th	K															
14th	J															
17th	H															
22nd	M															
28th	L															

According to the arrangement, M travels on the 22nd of the same month.

Hence, the correct answer is option 4).

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Q56. Answer: (a) Jammu & Kashmir

The correct answer is Jammu & Kashmir

Key Points

• Around 80% of all apples produced in the nation are produced in Jammu and Kashmir. With annual earnings of over Rs. 1500 crores, apple agriculture and its value chain are one of the foundations of rural economies.

• Apple producing districts in Kashmir -

• Srinagar, Ganderbal, Budgam, Baramulla, Kupwara, Anantnag, and Shopian districts produce the majority of the country's apples, However smaller amounts are also reported in Udhampur, Doda, Poonch, Ramban, and Reasi.

• Apple production -

• Kashmir produces about 11 MT/hectare, compared to over 40 MT/hectare in countries like Italy, Chile, France, etc.

• Area under cultivation -

• A 250 hectare area has been covered with high density plantation.

Additional Information

• Agricultural exports from Jammu and Kashmir include-

• apples, barley, cherries, corn, millet, oranges, rice, peaches, pears, saffron, sorghum, vegetables, and wheat.

• Production of apple in India -

Sr. No	State	Production (tonnes)	Share (%)
1.	Jammu & kashmir	1,719.42	70.54
2.	Himachal Pradesh	643.85	26.42
3.	Uttarakhand	64.88	2.66
4.	Arunachal Pradesh	7.34	0.30
5.	Nagaland	1.80	0.07
6.	Telangana	0.08	0.00

Q57. Answer: (d) North-West

Given,

Radhika moves 30 metres in West direction.

Then she turns to her right and moves 10 metres.

Then she turns to her left and moves 30 metres.

According to the statements, the direction and distance diagram is shown below;

According to the direction and distance diagram, Radhika is in the North-West direction from the starting point.

Hence, the correct answer is option 4).

Q58. Answer: (a) 39.8%

The correct answer is 39.8%.

Key Points

• Worker Population Ratio (WPR): It expanded from 38.2% in the earlier year to 39.8%.

• The Laborer Populace Proportion (WPR) has expanded to 52.6 percent in 2020-21 from 46.8 percent in 2017-18, said Association serve Jitendra

• Singh on Thursday in a composed answer to an inquiry in Rajya Sabha.

• India Laborer Populace Proportion information accounted for 34.70 % in 2018.

• The provincial regions recorded a joblessness pace of 3.3% and metropolitan regions recorded a joblessness pace of 6.7%.

Additional Information

• The joblessness rate in the nation expanded strongly to 6.1%, according to the Occasional Workforce Overview 2017-18 information, from 2.2%, in light of the Public Example Study, 68th cycle, 2011-12.

• The specialist populace proportion is characterized as the quantity of utilized individuals per thousand individuals. WPR = number of utilized individuals duplicated by 1000/complete populace The Laborer Populace Proportion is a pointer used to survey the country's business circumstance.

• The Workforce, as per Current Week by week Status (CWS), is the number of people either utilized or jobless on a normal in seven days going before the date of the study.

• The movement rate is 28.9%. The movement rate among ladies was 48% and 47.8% in provincial and metropolitan regions,

separately.

Q59. Answer: (b) 176400

Shortcut Trick

Let LCM be L and HCF be H.

L + H = 1050 and L − H = 630.

L = (1050 + 630) ÷ 2 = 840.

H = (1050 − 630) ÷ 2 = 210.

Product of numbers = L × H = 840 × 210 = 176400.

Therefore The correct answer is 176400.

Alternate Method

Given:

Sum of LCM and HCF = 1050

Difference between LCM and HCF = 630

Formula Used:

Product of two numbers = LCM × HCF

Calculations:

=> Let LCM = L and HCF = H

=> L + H = 1050 ---(i)

=> L − H = 630 ---(ii)

=> Adding (i) and (ii): 2L = 1680

=> L = 840

=> Substituting L in (i): 840 + H = 1050

=> H = 1050 − 840 = 210

=> Product of two numbers = 840 × 210

=> Product of two numbers = 176400

Therefore The correct answer is 176400.

Additional Information

Fundamental Property of HCF and LCM

For any two positive integers a and b, HCF(a, b) × LCM(a, b) = a × b.

HCF as a Factor

The HCF of two or more numbers is always a factor of their LCM.

Co-prime Numbers

If the HCF of two numbers is 1, they are called co-prime numbers, and their LCM is equal to their product.

Q60. Answer: (a) the centre of curvature

The correct answer is the centre of curvature.

Key Points

• If a hollow sphere is cut into parts and the outer surface of the cut part is painted, then it becomes a mirror with its inner surface as the reflecting surface. This type of mirror is known as concave mirror.

• In this mirror light converges at a point when it strikes and reflects back from the reflecting surface of the concave mirror. Hence it is also known as a converging mirror.

• When the concave mirror is placed very close to the object a magnified, erect and virtual image is obtained.

• However, if the distance between the object and the mirror increases, the size of the image is formed inverted at the same point of the object where it is located and hence we obtain a real and inverted image.

• Thus, when an object is kept at the centre of curvature of a concave mirror, the image will be formed at the centre of curvature itself.

Q61. Answer: (b) 42 and 6

Shortcut Trick

Ratio of ages of A and B is 7 : 1.

Total ratio parts = 7 + 1 = 8 units.

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8 units = 48 years => 1 unit = 6 years.

A age = 7 × 6 = 42 years; B age = 1 × 6 = 6 years.

Therefore The correct answer is 42 and 6 years.

Alternate Method

Given:

A's age = 7 × B's age

Sum of ages = 48 years

Calculations:

=> Let B's age be x.

=> Then A's age = 7x.

=> According to the question, 7x + x = 48

=> 8x = 48

=> x = 48 ÷ 8

=> x = 6 years (B's age)

=> A's age = 7 × 6 = 42 years

Therefore The correct answer is 42 and 6 years.

Additional Information

Ratio and Proportion in Ages

If the ratio of ages of two persons is a : b and the sum of their ages is S, then their ages are [a/(a+b)] × S and [b/(a+b)] × S.

Age Difference Property

The difference between the ages of two persons remains constant throughout their lives, regardless of how many years pass.

Percentage Change in Ages

Percentage increase in age over 'n' years = (n / Original Age) × 100.

Q62. Answer: (a) 1

Given Statements:

I ≥ R > U ≤ T > Q ≥ O

Conclusions:

1. I > U → True (As, I ≥ R > U)

2. O > T → False (As, T > Q ≥ O) It doesn't follow

3. R > T → False (As, R > U ≤ T) It doesn't follow

4. U < Q → False (As, U ≤ T > Q) It doesn't follow.

Hence, the correct answer is option 1).

Q63. Answer: (d) Forest

The correct answer is a forest.

Key Points

• In India throughout the 1970s, rural inhabitants, particularly women, engaged in a peaceful social and biological movement known as Chipko development, sometimes known as Chipko Andolan, with the goal of defending trees and forests slated for government-sponsored logging.

• Dhoom Singh Negi, Bachni Devi, Gaura Devi, and Sudesh Devi were a few of the main individuals that were crucial to the Chipko movement.

• The initiative was aided by the Gandhian lobbyist Sunderlal Bahuguna, whose appeal to Indira Gandhi, the Indian State leader at the time, led to the ban on tree cutting.

• The five Fs of the Chipko movement are necessities for a self-sufficient community and include food, grub, fuel, fibre, and manure.

Additional Information

• Sunderlal Bahuguna started the Chipko movement in the Garhwal forest.

• The campaign aimed to put an end to the practise of cutting down trees for commercial gain.

• Locals peacefully embraced trees to stop them from being cut down during the protest.

• The decision by the administration to provide wooded land to a company that sells video games was what started the Chipko movement.

• When the public authorities announced the sale of 2,500 trees in January 1974, disregarding the Alaknanda watercourse, that

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was the turning point.

Q64. Answer: (b) Bandhan Financial Services Pvt Ltd

The correct answer is Bandhan Financial Services Pvt Ltd.

Key Points

• Bandhan Monetary Administration, the primary microfinance organization in the country to win a bank permit, is likewise one of the most youthful elements to be permitted to enter the financial space.

• Ghosh's Bandhan Monetary Administration was the main microfinance organization in the country to win a financial permit from the Hold Bank of India (RBI) in April 2014.

• In 1974, SEWA (Independently employed Ladies' Affiliation) Bank, a helpful bank, was laid out in Ahmedabad; as one of the primary cutting-edge microfinance organizations in the country.

• The methodology of microfinance was regulated by Yunus in 1976, with the groundwork of Grameen Bank in Bangladesh.

Additional Information

• Madura is a main NBFC-MFI giving unstable microfinance credits to ladies' self-improvement gatherings in the country and semi-metropolitan regions.

• Annapurna Money is appraised 4.2 out of 5, in view of 694 audits by representatives on AmbitionBox.

• Annapurna Money is known for Employer stability which is evaluated at the top and given a rating of 4.2. Be that as it may, Balance between serious and fun activities is appraised the least at 3.8 and can be gotten to the next level.

• BSS Microfinance Restricted is a microfinance organization that at present goes about as a 'Business Reporter' of Kotak Mahindra Bank Restricted however at first was doing tasks as a Trust which was set up in 1999.

Q65. Answer: (c) Two

According to the given information,

The given word is ARGUMENT.

When the alphabet are arranged in alphabetical order.

As we see that the position of A and G remain unchanged in the newly formed word.

Hence, the correct answer is option 3).

Q66. Answer: (b) Drass

The correct answer is Drass.

Key Points

• Throughout the colder time of the year 1995, when the warm perusing diminished to - 60 degrees Celsius, the most minimal temperature decrease was seen in Dras.

• At 34.4°E, Dras town is found. In India, Dras is the coldest spot, encountering a Mediterranean mainland environment impacted by elevation.

• Arranged at a height of 3350 m, Drass is the coldest spot in India and second to the coldest occupied locale on The planet.

• The typical temperature throughout the colder time of the year season goes down to - 23 ºC.

Additional Information

• A forlorn town in the scandalous Kargil locale of Jammu and Kashmir, Dras is prominently known as 'the doorway to Ladakh'.

• Oymyakon is the coldest forever occupied put on The planet and is tracked down in the Icy Circle's Northern Pole of Cold.

• Jammu is the colder time of year capital of the Indian association region of Jammu and Kashmir.

• The town is renowned for lovely strolling encounters on slopes encompassed by pine and oak timberlands.

• Mount Abu, relatively close to Jodhpur and Udaipur, is home to numerous strict landmarks, the most popular being the Dilwara sanctuary, Brahmakumari Ashram, Master Shikhar, and the sanctums of Jainism.

Q67. Answer: (c) Gujarat

The correct answer is Gujarat.

Key Points

• The Swaminarayan Sampraday was spread out by Bhagwan Swaminarayan some time back in Gujarat and later formalized by His third significant substitution Brahmaswarup Shastriji Maharaj in the unobtrusive local area of Bochasan, Gujarat.

• The Swaminarayan Gadi (Maninagar) was established during the 1940s by Muktajivandas Master after he left the Ahmedabad bishopric with the conviction that Gopalanand Master, a Paramhansa from Swaminarayan's time, was the profound replacement to Swaminarayan.

• The ongoing profound pioneer is Jitendrapriyadasji Master.

• These six sanctuaries were underlying the presence of Bhagwan Shree Swaminarayan around quite a while back.

Additional Information

• The main sanctuary Swaminarayan developed was in Ahmedabad in 1822, with the land for development given by the English Royal Government.

• Umaid Bhawan Castle: It is the biggest Illustrious Royal residence in Rajasthan. It is likewise quite possibly the biggest confidential home on the planet.

• The Kalka-Shimla Rail route is a mountain rail route that is a UNESCO World Legacy Site. Shimla is likewise a renowned skiing fascination in India.

• Aside from these, Bandhavgarh Public Park, Kanha Public Park, Bhimbetka Caverns, Omkareshwar, Chitrakuta, and Amarkantak are some other renowned traveler objections in Madhya Pradesh

Q68. Answer: (a) pop sound

The correct answer is pop sound.

Key Points

• Hydrogen gas is developed generally when a metal responds with a corrosive.

• At the point when zinc responds with weakened sulphuric corrosive, zinc sulfate, a salt, is shaped with the arrival of hydrogen gas.

• When a consuming matchstick is brought close to the test tube containing hydrogen gas,

• it puts off the consuming matchstick and produces a pop strong.

• Hydrogen gas is delivered when zinc is responded with sulphuric corrosive.

Zn+H 2SO4(aq)→ZnSO4(aq)+H2

Additional Information

• A gas fire seeming yellow or orange in a variety of acting with pops of yellow or orange shows an ill-advised proportion of oxygen for burning.

• These green flares are delivered by the discharge of energized copper particles when copper sulfate is added to the copying liquor.

• Red or yellow flares mean there could be an issue, like fragmented ignition.

• This tone is brought about by extremely fine ash particles created by the fire, which consumes almost a portion of the temperature it should.

• Pop sound means the presence of any ignitable gas, which would promptly burst into flames when it is acquired contact with adequate intensity or fire.

Q69. Answer: (b) 3

Given:

5n+2 = 3125

Calculation:

=> 5n+2 = 3125

Express 3125 in the form of factors of 5,

=> 5n+2 = 5^5

Equating the powers,

=> n + 2 = 5

=> n = 5 – 2 = 3

Therefore, the required value of n is 3.

Hence, the correct answer is option 2).

Q70. Answer: (a) T

Given:

Amongst six friends P, Q, R, S, T, and U, each has a different height.

_ > _ > _ > _ > _ > _

Step 1) R is taller than only two other friends.

_ > _ > _ > R > _ > _

Step 2) T is shorter than only one friend.

_ > T > _ > R > _ > _

Step 3) Q is shorter than R but taller than P.

_ > T > _ > R > Q > P

Step 4) S is shorter than U.

U > T > S > R > Q > P

According to the arrangement, T is the second tallest among all the friends.

Hence, the correct answer is option 1).

Q71. Answer: (d) United Nations Environment Programme

the correct answer is United Nations Environment Programme.

Key Points

• Coordination of environmental responses across the United Nations system is the responsibility of the United Nations Environment Programme (UNEP).

• Maurice Strong, its first director, created it following the United Nations Conference on the Human Environment in Stockholm in June 1972.

• Its goal is to give leadership, produce science, and develop solutions to a wide variety of issues, including climate change, the management of marine and terrestrial ecosystems, and green economic growth.

• The group also creates worldwide environmental treaties, disseminates environmental knowledge, and aids national governments in achieving environmental goals.

Additional Information

World Organization and Headquarters

Organisation	Established Year	Headquater
International Telecommunication Union (ITU)	1865	Geneva
International Labour Organization (ILO)	1919	Geneva
World Tourism Organization	1925	Madrid (Spain)
International Monetary Fund (IMF)	1945	Washington D.C.
World Bank	1944	Washington D.C.
UNESCO	1946	Paris
World Health Organization (WHO)	1948	Geneva
BIMSTEC	1997	Dhaka
ASEAN	1967	Jakarta (Indonesia)
New Development Bank (NDB)	2014	Shanghai (China)

Q72. Answer: (a) Only conclusions III follows

Given,

Statements:

1. All statements are books.

2. Some books are copies.

3. No copy is a thesaurus.

The Venn Diagram:

Conclusions:

I. Some thesauruses are copies. → False (No copy is a thesaurus)

II. No statement is a thesaurus. → False (No definite relation between statement and thesaurus)

III. Some books are statements. → True (All statements are books.)

Hence, the correct answer is option 1).

Q73. Answer: (d) the speed of light in fluid A is reduced by 1.47 times than the speed of light in vacuum

The correct answer is the speed of light in fluid A is reduced by 1.47 times than the speed of light in vacuum.

Key Points

• A medium's refractive index (n) is defined as the ratio of the speed of light in a vacuum to the speed of light in air.

• Mathematically, it is n=c/v where c is the speed of light in a vacuum and v is the speed of light in air.

• The refractive index is the relationship between the speed of light and the speed at which light travels.

• For example, the refractive index of glass is about 1.5, meaning that light is 1.5 slower in that medium.

• So, here the refractive index of fluid A is 1.47 which means that the speed of light in fluid A is reduced by 1.47 times that of the speed of light in a vacuum.

Q74. Answer: (d) 43

The logic followed in the given series is:

Sum of digits in the first term = Sum of digits in the second term

Now we apply the logic to the given series:

18 : 36 :: 42 : 51 :: 25 : ?

1 + 8 = 3 + 6

9 = 9

and,

18 : 36 :: 42 : 51 :: 25 : ?

4 + 2 = 5 + 1

6 = 6

Now we apply the logic with the given options:

18 : 36 :: 42 : 51 :: 25 : ?

Option 1) 48

2 + 5 = 4 + 8

7 ≠ 12

Option 2) 41

2 + 5 = 4 + 1

7 ≠ 5

Option 3) 45

2 + 5 = 4 + 5

7 ≠ 9

Option 4) 43

2 + 5 = 4 + 3

7 = 7

Hence the correct answer is option 4).

Q75. Answer: (a) 102

The pattern followed here is shown below:

Hence, the correct answer is option 1).

Q76. Answer: (d) 20%

Given:

Name of the Students	**Marks**		
English	Maths	Computer	
Arav	74	82	72
Toshita	71	92	49
Pranay	59	65	66
Vibhor	81	78	82

Calculation:

=> Total marks scored by Arav = 74 + 82 + 72 = 228

=> Total marks scored by Pranay = 59 + 65 + 66 = 190

=> Difference = 228 – 190 = 38

Percentage increase with comparison to Pranay's score = 38/190× 100 = 20%

Therefore, Arav's total marks is 20% more than the total marks of Pranay.

Hence, the correct answer is option 4).

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Q77. Answer: (d) In old xylem (heartwood)

The correct answer is In old xylem (heartwood)

Key Points

• Waste materials are kept in cellular vacuoles in plants. In plants, waste products are frequently retained as gums and resins in old xylem. Additionally, it is kept in shedding leaves.

• Resins and gums are metabolic byproducts of plant tissues that are produced either naturally or frequently as a result of illness or damage to a plant's bark or wood.

• Plant cells produce resins and gums as metabolic byproducts. They develop in specialized buildings known as passage ducts. Gums are the usual waste products created when plant cellulose breaks down.

• These waste products build up in the vacuoles of ageing cells, like old xylem. These cells eventually pass away after dying.

• Therefore, a tall tree can store its waste products in old xylem (heartwood).

Additional Information

Excreta in plants can also result in the following:

Name	Process
Diffusion	Aquatic plants use diffusion to expel metabolic waste. Plants that grow on land exude sap into the ground.
Transpiration	Stomata, stem lenticels, the outside of stems, fruits, etc., are all places where gaseous excrement and water are expelled.
Storing	Some unprocessed wastes are kept in plant tissues like leaves and bark.

Q78. Answer: (d) 24

Shortcut Trick

Assume an average of 25.

Deviations from 25: (15−25)=−10, (17−25)=−8, (20−25)=−5, (25−25)=0, (32−25)=+7, (35−25)=+10

Net Deviation: −10 − 8 − 5 + 0 + 7 + 10 = −6

Adjustment: −6 ÷ 6 = −1

Correct Average: 25 − 1 = 24

Therefore The correct answer is 24.

Alternate Method

Given: Numbers = 15, 17, 20, 25, 32, 35

Formula: Average = Sum of all observations ÷ Total number of observations

Calculations:

=> Total count of numbers (n) = 6

=> Sum = 15 + 17 + 20 + 25 + 32 + 35

=> Sum = 144

=> Average = 144 ÷ 6

=> Average = 24

Therefore The correct answer is 24.

Additional Information

Properties of Average

If a constant value k is added to or subtracted from every number in a set, the new average will be the old average plus or minus k.

Arithmetic Progression (AP) Average

For a series in Arithmetic Progression, the average is always the middle term (for odd count) or the mean of the two middle terms (for even count), also calculated as (First + Last) ÷ 2.

Weighted Average

When different groups have different sizes, use Weighted Average = (n1w1 + n2w2 + ...) ÷ (n1 + n2 + ...), where n is the count and w is the value/average.

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Q79. Answer: (c) National Commission for Women

The correct answer is National Commission for Women

Key Points

• National Commission for Women was formed in 1992 under the National Commission for Women Act 1990 (Act No. 20).

• 1st chairperson of the National Commission for Women was Mrs. Jayanti Pattnaik

• the current chairperson is Mrs. Rekha Sharma, who took charge on 07.08.2018

• Alok Rawat was the first male member of the commission.

• The commission shall consist of a chairperson.

• The commission shall also consist of five members having expertise in law and issues related to women.

• There shall be a member secretary who must be a central gazetted officer having management and sociological expertise.

Additional Information

National Human Rights Commission

• Human rights are not given a clear meaning anywhere. It is stated that a person has human rights from the moment of his or her birth.

• Humans have a variety of rights, including the right to life, the right to dignity, the right to a living, and many others. Moral rights include human rights. They encompass all people.

• It has been noted that without protection, rights do not serve their intended function. Conventions, summits, and commissions have been established to defend human rights.

National Commission for Backward Classes

• The 102nd Constitution Amendment Act of 2018 grants the National Commission for Backward Classes constitutional authority. (NCBC).

• It has the authority to investigate welfare claims and initiatives for academically and socially underprivileged groups.

• Prior to this, the NCBC was a statutory organization under the control of the Ministry of Social Justice and Empowerment.

National Commission for Minorities

• The act states that the Commission shall consist of: a Chairperson, a Vice Chairperson.

• The Central Government will designate five members from among people of distinction, talent, and integrity;

• With the proviso that the Chairperson and five other members must be from minority populations.

Q80. Answer: (c) 96

Shortcut Trick

For a cube with edge (a) = 4 m.

Total Surface Area = $6 \times a^2$

=> $6 \times 4^2 = 6 \times 16 = 96$ m².

Therefore The correct answer is 96 m².

Alternate Method

Given:

Edge of the cube (a) = 4 m

Formula Used:

Total Surface Area (TSA) of a cube = $6 \times (\text{Side})^2$

Calculations:

=> Total Surface Area = $6 \times (4\text{ m})^2$

=> Total Surface Area = 6×16 m²

=> Total Surface Area = 96 m²

Therefore The correct answer is 96 m².

Additional Information

Lateral Surface Area of Cube

The area of the four vertical faces is given by $4 \times a^2$.

Volume of Cube

The space occupied by the cube is calculated as a^3 (Side × Side × Side).

Diagonal of Cube

The longest rod that can be placed inside a cube has a length of $\sqrt{3} \times a$.

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Q81. Answer: (b) Lead iodide

The correct answer is Lead iodide.

Key Points

• A yellowish solid precipitates when a solution of potassium iodide is added to a solution of lead nitrate that has been taken in a test tube.

• Lead iodide is this opalescent solid. Lead iodide and potassium nitrate are created together.

• Iodide ions displace nitrate from lead nitrate and nitrate replaces iodine from potassium iodide when aqueous lead nitrate is introduced.

• As a result, potassium nitrate and lead iodide, two new compounds, are created. This is an illustration of a double displacement reaction.

• Additionally, the things produced have an odd colour. Lead nitrate is yellow in colour while potassium nitrate is white when it is created.

• The Precipitate produced is the chemical compound lead iodide.

• Therefore, lead iodide is formed when lead nitrate is mixed with potassium iodide.

Additional Information

Compound	Properties
Lead carbide	A hypothetical chemical combination of lead and carbon is called lead carbide. Even at extremely high temperatures, lead and carbon do not typically mix.
Lead nitride	White, crystalline lead nitrate is solid. The substance dissolves in water. Although it is noncombustible, it will quicken the combustion of combustible substances.
Lead oxide	A class of inorganic substances having the chemical formulae lead and oxygen is called lead oxide. Lead oxide is a well-known significant industrial substance that has been extensively used in batteries.

Q82. Answer: (a) Guru Nanak Dev

The correct answer is Guru Nanak Dev.

Key Points

• Guru Nanak was an Indian spiritual leader who founded Sikhism, a monotheistic religion with Hindu and Muslim roots. He was born in Rai Bhoi di Talvandi (now Nankana Sahib, Pakistan), close to Lahore, and passed away at Kartarpur, Punjab, in 1539.

• As both their founder and the supreme master of Punjabi devotional singing, he maintains a particular place in the hearts of modern Sikhs.

• After some time, he settled in the Punjabi village of Kartarpur, where he amassed a sizable following and became known as the first Guru of the Sikhs.

• The Janam-sakhis are collections of stories about his life that were gathered after his passing.

Additional Points

Guru Amar Das

• Guru Amar Das (1522–1574), the third Sikh Guru, was granted this name at the advanced age of 73. He was born in Khadur, India, in 1479, and passed away in Goindwal in 1574.

• He is well known for establishing administrative districts in Punjab and lending assistance to Sikh missionary initiatives.

Guru Tegh Bahadur

• Guru Tegh Bahadur, the second Sikh martyr and ninth Sikh Guru (1664–1775), was born in Amritsar, Punjab, India, on November 11, 1621, and died there on November 11, 1675.

• He was also the 10th Guru's father, Gobind Singh.

Guru Gobind Singh

• The Khalsa (Punjabi: "the Pure," the Sikhs' military brotherhood) was established by Guru Gobind Singh, sometimes referred to as Gobind Ri, the tenth and final personal Sikh Guru (1675–1708). He was born in India's Patna, Bihar, in 1666, and passed away on October 7, 1708, in Nanded, Maharashtra.

Q83. Answer: (b) 60,000

Calculation:

Number of people who qualified driving test in 1996 = 60% of 25000

= 60/100× 25000 = 15,000

People qualified the driving test in 1997 = 45000 – 15000 = 30,000

According to the question,

=> People qualified the driving test in 1997 = 50% = 30,000

=> Total number of people who took the driving test in 1997 = 30000 + 30000 = 60,000

Therefore Total number of people who took part in the driving test in 1997 is 60,000.

Q84. Answer: (c) Spring

The correct answer is "spring".

Key Points

• New buds grow in the spring. When compared to other regions of the plant, these buds require more energy to expand.

• This energy is transferred to the buds through the phloem from the sugar that is stored in the root or stem tissue. Thus, springtime sugars are necessary for buds.

• The interaction of the xylem and phloem results in this transport.

• During the spring, the growing buds' demand for carbohydrates frequently exceeds the local storage capacity, necessitating the transportation of sugars from other parts of the plant, such as limbs, stems, and roots. Both the phloem and the xylem are capable of carrying such great distances.

• Carbohydrates are transported through the xylem, and phloem Münch flow maintains this transport by recirculating water.

• Before the leaves become independently photosynthetic and in the absence of transpiration, the phloem Münch flow transports and mobilizes sugars from distant regions by acting as a pump to generate water flux in the xylem.

• Therefore, the correct answer is: Spring

Additional Information

• In order to reach the other organs, particularly storage organs, the sugars that are incorporated in leaves (as a consequence of photosynthesis) are transported downward, upward, and diagonally, primarily by phloem. The translocation of these sugars appears in the form of sucrose.

• The most prevalent type of carbohydrate used by plants to transfer carbon is sucrose. Sucrose can dissolve in water whilst retaining its structural stability.

• Plant cells could therefore export sucrose into the specific vascular tissue called phloem that is made specifically to transport sugars.

Q85. Answer: (c) 13

Given expression:

4 ÷ 4 - 45 × 5 + 12 = ?

We substitute the given sequence in each option and solve using BODMAS rule:

Symbols	Stands for
•	•
•	•
×	÷
÷	×

After interchanging the given symbols the expression formed is :

=> 4 × 4 + 45 ÷ 5 - 12

=> 4 × 4 + 9 - 12

=> 16 + 9 - 12

=> 25 - 12

=> 13

Hence, the correct answer is option 3).

Q86. Answer: (a) Second Five-Year Plan

The correct answer is Second Five-Year Plan

Key Points

• The second five-year plan's main emphasis was on industry, particularly heavy industry. To achieve the target of a 25% increase in national income, rapid industrialisation was adopted.

• Using the Mahalanobis model, the second five-year plan is created. The USSR model was Indianized by PC Mahalanobis, the founder of the Indian Statistical Institute and a close Nehru ally.

• This strategy is acknowledged to have produced the statistical underpinnings for state-directed investments and the philosophical foundations for the licencing raj through an intricate input-output model.

• This model suggested that in order to achieve higher long-term growth, the Indian economy should concentrate more of a focus on heavy industries.

• The Industrial Policy Resolution of 1956 and India's second five-year plan, which paved the ground for the growth of the public sector and the licencing raj, were both established using this idea.

Important Points

• Steel mills were developed at Bhilai, Durgapur, and Rourkela under the second five-year plan.

• Increased coal output and new railroad connections were also part of this strategy.

• The Atomic Energy Commission was originally led by Homi J. Bhabha when it was founded in 1957.

• The Tata Institute of Fundamental Research was established as a research facility.

• In 1957, a talent search and scholarship programme was launched to find outstanding young people who could receive training in the nuclear power sector.

Additional Information First Five-Year Plan

• This theory was developed to further the notion of a self-sufficient closed economy by Professor P. C. Mahalanobis. The five-year plans Domer developed for the Soviet Union had a significant impact on the strategy.

• The Harrod-Domar model, which proposed that growth was dependent on two things, served as the foundation for the strategy. First, a high level of savings made it possible to invest more, and second, a low capital-output ratio made it possible to invest more effectively and experience faster development.

• The major priorities in this strategy were initiatives related to agriculture, irrigation, and power. A total budget of Rs. 2069 crore (2.5%) was allocated to irrigation and energy (27.2%), agricultural and community development (17.4%), transportation and communications (24%), industry (8.4%), social services (16.64%), land restoration (4.1%), and others. The idea worked because of good monsoons and higher agricultural yields.

Third Five-Year Plan

• The first two plans established the country's institutional framework and put it on the road to becoming a developed economy. The third plan was able to capitalise on the initial wave of lofty expectations brought on by India's general economic development.

• As part of this initiative, India made an effort to become self-sufficient in both food production and industry. Nevertheless, there were a lot of political and economic problems during the plan's implementation.

• Both the Indo-China War (1962) and the Indo-Pak War (1965) exposed the nation's vulnerabilities.

• The emphasis of defence production was greatly altered by these fights.Jawaharlal Nehru and Lal Bahadur Shastri's deaths in 1964 and 1965, respectively, had a negative impact on the nation's spirits. Furthermore, the issue worsened during the near-famine year of 1965–1966 as a result of a shortage of buffer stockpiles.

Fourth Five-Year Plan

• Agriculture in India was boosted by the Green Revolution, and 14 important Indian banks were nationalised under the Indira Gandhi administration.

• India engaged in a third conflict with Pakistan, aiding in the creation of Bangladesh this time. The war effort absorbed the funds intended for development.

• The nationalization of 14 significant Indian banks during the war was a significant development. As a result, more private savings were mobilized into the banking system and people's trust in the banking system strengthened.

• As part of this strategy, India also carried out the Smiling Buddha underground nuclear test in 1974. This test was conducted in part in reaction to the Seventh Fleet of the United States being stationed in the Bay of Bengal to issue warnings to India not to attack West Pakistan and escalate the conflict.

• India was exposed to a number of severe foreign policies, all of which had a negative impact on the economy of the nation.

• Oil and fertilizer prices increased as a result of the 1973 Oil Crisis, leading to extraordinarily high inflation.

Q87. Answer: (a) 99

The pattern followed here is shown below:

Hence, the correct answer is option 1).

Q88. Answer: (c) Exothermic reaction

The correct answer is "Exothermic reaction".

Key Points

• The reaction generates far too much heat that the reaction mixture begins to boil. The energy of the product is lower than that of the reactant.

• Calcium oxide, which is composed of calcium and oxygen atoms, is the chemical name for quick lime. Calcium hydroxide is created when calcium oxide and water interact.

• This is an exothermic reaction because a significant quantity of energy is emitted when it happens.

• Since only one product is generated from the two reactants, the reaction that produces calcium hydroxide from calcium oxide and water is a combination reaction. As a result, quick lime and water react exothermically.

• Therefore, this process is referred to as an exothermic reaction.

Additional Information

Reaction	Properties
Dissociation reaction	Using some energy, more giant molecules will disintegrate to generate new molecules in a reaction known as a dissociation reaction. In the generation of electricity, the necessary energy can be obtained.
Double displacement reaction	Chemical reactions known as double displacement reactions occur when the reactant ions move around to create new products. Precipitate production often happens as a result of a double displacement process.
Displacement reaction	When another atom replaces an atom or group of atoms in a molecule, this is referred to as a displacement reaction.

Q89. Answer: (c) 1 over 60^5

Given:

3-5 × 4-5 × 5^(-5)

Concept Used:

a^d × b^d × c^d = (a × b × c)^d

Calculation:

=> 3-5 × 4-5 × 5^(-5)

As each term have the same powers, so multiply the bases.

=> 3-5 × 4-5 × 5^(-5) = (3 × 4 × 5)^(-5)

=> (60)^(-5) = 1/(60^5)

Therefore, the required value is 1/(60^5).

Hence, the correct answer is option 3).

Q90. Answer: (d) Pune

The correct option is Pune.

Key Points

• Over 95% of the uranium in natural seawater was successfully removed during an experiment by a team of scientists from Pune's Indian Institute of Science Education and Research (IISER).

• Due to the growing threat posed by the expanding use of fossil fuels, it is critically necessary to identify sustainable and environmentally friendly energy sources on a worldwide scale.

• While growing in popularity, renewable energy sources like the sun and wind might not be sufficient to meet the world's escalating energy needs. Scientists from Pune's Indian Institute of Science Education and Research have retrieved over 95% of the uranium present in natural saltwater (IISER).

• Natural uranium reserves are anticipated to exhaust over the next century, pushing nations to develop new methods of producing the vital component that powers nuclear power plants all over the world.

Additional Information

NAME OF INSTITUTE	NUMBER OF SEATS
IISER Berhampur	224
IISER Kolkata	250
IISER Bhopal	252
IISER Mohali	244
IISER Pune	288

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IISER Thiruvanthapuram	302
IISER Tirupati	174

Q91. Answer: (a) 2030

The correct answer is 2030.

Key Points

• By 2030, the 100% Gross Enrollment Ratio in School Education is the goal set forth in National Education Policy 2020.

• Through the open schooling system, NEP 2020 will reintegrate 2 crore out-of-school youngsters.

• The NCTE will cooperate with NCERT to develop a brand-new, comprehensive National Curriculum Framework for Teacher Education, or NCFTE 2021. By 2030, a 4-year integrated B.Ed degree will be the prerequisite for teaching.

• The policy places a strong emphasis on the necessity of ensuring that every child enrolled in school is able to finish their education and meet learning objectives.

• Mother tongue or regional language should be used for instruction up to at least Grade 5. No pupil will be forced to learn a language.

• Assessment changes that assess student progress toward reaching learning outcomes using a 360-degree holistic progress card.

Additional Information

• Together, the Center and the States will expand public investment in the education sector to, at the earliest, 6% of GDP.

• In order to offer a forum for the open exchange of thoughts on the use of technology to improve learning, evaluation, planning, and administration, the National Educational Technology Forum (NETF) will be established.

• In 15 years, college affiliation will be phased down, and a framework will be set up to provide institutions varying degrees of autonomy. Every college is expected to eventually become either an autonomous college that awards degrees or a constituent college of a university.

• A single, comprehensive umbrella organisation for all higher education, except medical and legal education, would be established as the Higher Education Commission of India (HECI). The National Higher Education Regulatory Council (NHERC) will be responsible for regulation, the General Education Council (GEC) will define standards, the Higher Education Grants Council (HEGC) will provide money, and the National Accreditation Council (NAC) will oversee accreditation. Universities that are both public and private will be subject to the same regulations, accreditation requirements, and academic standards.

• By 2035, the gross enrollment ratio in higher education is expected to increase to 50%, and 3.5 crore seats would be added.

• In both urban and rural India, basic and higher education are covered under the national policy on education.

• The Education Commission's recommendations served as the foundation for the first NPE (1964-66). This programme aimed to achieve national cohesion and greater economic and cultural development by "radical revamping" India's educational system and equating chances for education for everyone.

• The NPE also demanded that all children receive the obligatory education that is spelled forth in the Indian Constitution up until the age of fourteen.

• The first education policy for the twenty-first century in India is NEP 2020. The National Education Policy 2020 places a strong emphasis on the development of each student's creative potential.

• Ancient academics including Charaka and Susruta, Aryabhata, Bhaskaracharya, Chanakya, Madhava, Patanjali, Panini, and Thiruvalluvar were referenced in the NEP 2020.

• The National Education Commission, also known as Rashtriya Shiksha Aayog, was suggested by the NEP as the country's top educational authority.

Q92. Answer: (b) 1 km/h

Shortcut Trick

When distance is constant, Speed is inversely proportional to Time.

Time ratio (Upstream : Downstream) = 2 : 1

Therefore Speed ratio (Upstream : Downstream) = 1 : 2

Using Speed in still water (u) and Stream speed (v) relation: u/v = (Up + Down) / (Down − Up) = (2 + 1) / (2 − 1) = 3/1

Given u = 3 km/h, then v = 1 km/h.

Therefore The correct answer is 1 km/h.

Alternate Method

Given: Speed of diver (u) = 3 km/h, Distance (D) = 50 km, Time upstream (t_u) = 2 × Time downstream (t_d).

Formula Used: Speed = Distance ÷ Time; Upstream speed = u − v; Downstream speed = u + v.

=> Let speed of stream be v km/h.

=> t_u = 50 / (3 − v) and t_d = 50 / (3 + v)

=> 50 / (3 − v) = 2 × [50 / (3 + v)]

=> 1 / (3 − v) = 2 / (3 + v)

=> 3 + v = 2(3 − v)

=> 3 + v = 6 − 2v

=> 3v = 3

=> v = 1 km/h

Therefore The correct answer is 1 km/h.

Additional Information

Relative Speed in Water

Upstream speed is the difference (u − v) and Downstream speed is the sum (u + v) of boat and stream speeds.

Still Water Speed Formula

Speed in still water (u) = 1/2 × (Downstream Speed + Upstream Speed).

Stream Speed Formula

Speed of stream (v) = 1/2 × (Downstream Speed − Upstream Speed).

Q93. Answer: (d) strong magnetic field

The correct answer is strong magnetic field.

Key Points

• The space or region around the current-carrying wire/moving electric charge or around the magnetic material in which force of magnetism can be experienced by other magnetic material is called magnetic field by that material.

• The value of this magnetic field is called magnetic field strength of that magnetic material.

• A magnetic field line is directed from north-pole to south-pole outside the magnet.

• They are closed and continuous curve.

• The magnetic field lines are crowded near the pole where the magnetic field is strong and are far apart near the middle of the magnet where the magnetic field is weak.

• Thus, when magnetic lines of forces are more crowded in the region of magnetic field, this indicates the presence of strong magnetic field.

Q94. Answer: (a) Vindhyan

The correct option is Vindhyan.

Key Points

• The Vindhyan range is bounded by the Satpura range on the south and the Aravalis on the northwest.

• The Western Ghats mountain range, the Satpura Range, the Vindhya Range, and the Aravalli Range all encircle the Deccan Plateau on its western, southern, northern, and western edges, respectively.

• The Vindhyan range stretches from Sasaram in the east to Jobat and Chittorgarh in the west. The Aravallis are to the west of the range, while the Central highlands are to the south.

• The mountain serves as a water barrier separating the Ganga basin from the peninsular plateau's river basins.

• Gujarat in the west and Chattisgarh in the east are separated by the Satpura mountains. The Vindhyas and these mountains are contiguous.

Additional Information

• The Deccan Plateau is a vast plateau in southern and central India that is bordered by the Satpura Range to the south and the Aravalis to the northwest.

• The Vindhya's precise boundaries are ill-defined, and historically, the title applied to a number of diverse hills ranges in central India, notably the Satpura Range.

• Aravali crosses the states of Rajasthan, Haryana, and Gujarat, as well as the provinces of Punjab and Sindh in Pakistan. The Banas and Luni rivers originate here. The highest mountain in the Aravallis is Guru Shikhar.

• A mountain range in the Lesser Himalayas is called Pir Panjal. It crosses the states of Himachal Pradesh and Jammu & Kashmir. Two significant peaks in this area are Deo Tibba and Indrasan.

• The Great Boundary Fault divides the Aravalis from the Vindhya mountains in the Central Highlands, sometimes referred to as the Madhya Bharat plateau.

• During the 1962 Chinese attack, the Kailash Range served as the battleground, with pivotal engagements occurring at Rezang La and Gurung Hill.

• The Sivalik Hills, sometimes referred to as the Shivalik Hills and Churia Hills, are a mountain range of the outer Himalayas that spans the northern regions of the Indian subcontinent for a distance of around 2,400 km from the Indus River eastward near to the

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Brahmaputra River. During the 1962 Chinese attack.

• On the southern tip of the Kathiawar Peninsula in the western Gujarat state in central India is the Gir Range, a low mountain range. The range is incredibly rough, sloping gradually inland to the north and steeply into the sea to the south. From it, a low, slender, dissected range extends northward, rising to Gorakhnath (3,665 feet [1,117 metres] high; thought to be an extinct volcano) in the vast Girnar Hills. The Sivalik Hills, sometimes referred to as the Shivalik Hills and Churia Hills, are a mountain range of the outer Himalayas that spans the northern regions of the Indian subcontinent for a distance of around 2,400 km from the Indus River eastward near to the Brahmaputra River. The 1962 Chinese Civil War took place in the Kailash Range.

Q95. Answer: (a) Both I and II strengthen the statement.

Statement:

All zoos should be banned except for endangered species of animals.

Arguments:

I. Animals are not for human entertainment but for coexistence with humans → Animals in the zoo are kept for human entertainment which is wrong and thus only the animals which must be kept safe and under supervision must be in the zoo, rest of the animals must be freed. So the argument strengthens the statement.

II. Endangered species need our concern to maintain an ecological balance → Endangered species are in a very fragile situation and only humans can prevent them from being extinct, the preservation of every species plays an important role in ecological balance therefore this argument also strengthens the given statement.

So, both I and II strengthen the statement.

Hence, the correct answer is option 1.

Q96. Answer: (c) Dr. BR Ambedkar

The correct answer is Dr. BR Ambedkar.

Key Points:

• The Indian lawyer, economist, social reformer, and politician Bhimrao Ramji Ambedkar served as the chairman of the committee that created the Indian Constitution from the discussions in the Constituent Assembly.

• He also held the position of Minister of Law and Justice in Jawaharlal Nehru's first administration.

• After the renunciation of Hinduism, he became an inspiration for the Dalit Buddhist movement.

• After graduating from Elphinstone College at the University of Bombay and pursuing economic studies at Columbia University and the London School of Economics, Ambedkar became one of the few Indians to receive a PhD from a university in the 1920s.

Additional Information:

• The Indian Constituent Assembly was selected to draught the country's constitution.

• It was chosen by the "Provincial Assembly."

• Members of the "Provisional Parliament of India" functioned as the country's first Parliament after India earned independence from British rule in 1947.

• The idea of a Constituent Assembly was put up in December 1934 by M. N. Roy, an advocate of radical democracy and a significant figure in the Indian Communist movement.

• In 1935, the Indian National Congress made a formal demand for it.

Q97. Answer: (b) rectangle

Shortcut Trick

When parallel lines are cut by a transversal, the sum of consecutive interior angles is 180°.

The bisectors of these angles divide them into two parts, so the sum of the half-angles is 180° ÷ 2 = 90°.

In the triangle formed by the transversal and two bisectors, the third angle must be 180° − 90° = 90°.

Since all four interior angles of the enclosed quadrilateral are 90°, the figure is necessarily a rectangle.

Therefore The correct answer is rectangle.

Alternate Method

Given: Two parallel lines L1 and L2 intersected by a transversal T.

Property Used: Consecutive interior angles are supplementary (sum = 180°), and the angle bisector divides an angle into two equal halves.

Let the parallel lines be L1 and L2 and the transversal be T.

Let the interior angles on one side of the transversal be angle 1 and angle 2.

=> angle 1 + angle 2 = 180° (Consecutive interior angles)

=> 0.5 × angle 1 + 0.5 × angle 2 = 90°

=> In the triangle formed by the bisectors and the transversal, the third angle = 180° − 90° = 90°.

=> Similarly, the angle formed by the bisectors on the other side is also 90°.

=> The angles at the points of intersection on the parallel lines are also 90° (sum of two half-angles of a linear pair).

=> A quadrilateral with all four angles equal to 90° is a rectangle.

Therefore The correct answer is rectangle.

Additional Information

Consecutive Interior Angles

When two parallel lines are cut by a transversal, the pairs of angles on the same side of the transversal and inside the parallel lines are supplementary (sum = 180°).

Angle Bisector Intersection

The bisectors of two supplementary angles always intersect at a right angle (90°).

Rectangle vs Square

While the figure is always a rectangle, it becomes a square only if the transversal intersects the parallel lines at a 90° angle.

Q98. Answer: (c) For each trait, there would be a single version in each child.

The correct answer is "For each trait, there would be a single version in each child".

Key Points

• Through the process of heredity, organisms inherit traits from their parents. Traits are the name for these features. Every person is distinct because they each possess a special set of characteristics.

• Inherited qualities are those that a parent passes on to its offspring during the fertilization process. Specific hereditary laws govern this inheritance. We can pass on inherited features to the next generation since they are encoded in our DNA.

• Examples: eye colour, height, skin tone, and hair colour.

• The differences that come from reproduction may be passed down, increasing the survival rate of entities. In sexually reproducing people, there are two copies of the same gene for each attribute.

• Each attribute has two copies in each child since father and maternal DNA can impact each trait.

• Therefore, the correct answer is: For each trait, there would be a single version in each child.

Additional Information

• The theories put forth by Gregor Mendel in 1865 provide the basis of our current understanding of how traits may be passed down through generations.

• Mendel, however, did not find these fundamental ideas of heredity through research on people, but rather through research on Pisum sativum, or the common pea plant.

• Gregor Mendel uncovered the basic principles of inheritance through his study on pea plants. He concluded that genes are inherited from each parent as separate, paired units.

Q99. Answer: (c) Germany

The correct answer is Germany.

Key Points:

• On August 5, 2021, Indian hockey's status was altered.

• The Indian men's hockey team returned to the Olympic podium for the first time in 41 long years at Tokyo 2020, taking home a bronze medal after defeating Germany in the third-place playoff.

• The medal's importance couldn't be emphasized enough.

• Indian hockey's decline over the following 40 years was puzzling as they dominated international hockey from the 1920s through the 1980s, a time during which they won eight gold, one silver, and two bronze medals at the Olympics.

Additional Information:

• India finally succeeded to break the Olympic hoodoo by reaching the quarterfinals in Rio 2016 after failing to go past the group rounds from 1984 to 2012.

• Progress at Tokyo 2020 was essential to maintaining the momentum.

• The enigmatic Manpreet Singh served as captain of the Indian squad, which entered the Tokyo Olympics in consistent form under the direction of coach Graham Reid.

• The team's confidence before the Tokyo Olympics was boosted by winning medals at prestigious competitions as the Asian Championships, Asia Cup, FIH Series Final, and a quarterfinal appearance at the FIH Men's World Cup 2018.

Q100. Answer: (d) more in light of 4500 Å

The correct answer is more in light of 4500 Å

Key Points

• The angle between the direction of the refracted ray and the direction of the incident ray when a ray of light passes from one

medium to the other is called as the angle of deviation.

• The angle of deviation depends on the angle of incidence, the wavelength of light used, the material of the prism and the angle of the prism.

• Shorter wavelengths travel more slowly through the prism and hence are more deviated as compared to longer wavelengths

• Hence angle of deviation increases with a decrease in wavelength

• So, given 4500 Å, 5400 Å, and 6000 Å, the angle of deviation is more in light of 4500 Å.

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