RRB NTPC CBT-I Official Paper (Held On: 19 Mar 2021 Shift 2) (Previous Year Paper)

RRB NTPC • 2021 • 100 questions • 90 minutes • Answer key and solutions

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Q1. Who among the following said, "The Rowlatt Act is a preventive murder"?

(a) JB Kripalani
(b) Edwin Samuel Montagu
(c) Bal Gangadhar Tilak
(d) Rajendra Prasad

Q2. A woman sells 78 pencils and gets a profit equal to the selling price of 13 pencils. Her profit percentage is:

(a) 19
(b) 20
(c) 17
(d) 9

Q3. The famous hill station Kodaikanal is situated in the:

(a) Arunachal hills
(b) Nilgiri hills
(c) Palani hills
(d) Seven hills

Q4. What would be the highest value of X in the given equation?

7X5 + 2Y3 + 8Z7 = 1805

(a) 9
(b) 0
(c) 5
(d) 7

Q5. Four pairs of numbers are given. Find the pair that is different from the others.

(a) 99 - 82
(b) 47 - 34
(c) 73 - 56
(d) 59 - 42

Q6. Rinki donates blood thrice in a year, each time 150 millilitres. How many litres of blood will he donate in 5 years?

(a) 2.75 litres
(b) 2.50 litres
(c) 2.00 litres
(d) 2.25 litres

Q7. The speed of three bikes is in the ratio of 3 : 4 : 5. The ratio of the time taken by these bikes to travel the same distance is :

(a) 20 : 15 : 12
(b) 20 : 15 : 13
(c) 20 : 15 : 17

(d) 20 : 17 : 12

Q8. What is the molecular formula of Plaster of Paris?

(a) CaSO4 ? 2H2O
(b) CaSO4 ? H2O
(c) CaOCl2 ? H2O
(d) CaSO4 ? 1/2H2O

Q9. Simplify

1÷[1-2÷{3-4÷(2+8÷5)}]+1 :

(a) 0
(b) 2
(c) 1
(d) -1

Q10. Find the HCF of 12/39 and 5over13.

(a) 12/13
(b) 60/39
(c) 60/13
(d) 1/13

Q11. Smart garbage bins made of Stainless Steel were launched by _____ in 2019.

(a) Indian oil Corporation
(b) Steel Authority of India Limited
(c) Bharat Heavy Electricals Limited
(d) Hindustan Petroleum

Q12. Where and when was the Ghadar Party founded?

(a) England, 1917
(b) America, 1913
(c) America, 1917
(d) England, 1913

Q13. The most common Harappan seals were _____ in shape.

(a) square
(b) rectangular
(c) circular
(d) hexagonal

Q14. Who among the following scaled Mount Everest 24 times and set a world record?

(a) Shubham Kaushik
(b) Tamba Tesaro
(c) Chris Bonington
(d) Kami Rita Sherpa

Q15. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

1. Some leaves are clouds.

2. Very few pillows are leaves.

Conclusions:

I. Some clouds are pillows.

II. Some clouds are not pillows.

(a) Only conclusion II follows.

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(b) Both conclusion I or II Follows.
(c) Only conclusion I follows.
(d) Either I or II Follows.

Q16. Which of the following diseases is borne by mosquitoes?
(a) Pneumonia
(b) Filariasis
(c) Goitre
(d) Cholera

Q17. Select the term that can replace the question mark (?) in the following series.
ADCE, BEF, JC, ?
(a) M
(b) J
(c) N
(d) D

Q18. The Golden Quadrilateral is associated with _____.
(a) sea transport
(b) railways
(c) air transport
(d) roads

Q19. Select the term that can replace the question mark (?) in the following series.
FX, IW, LV, OU, RT, ?, XR
(a) ZV
(b) YS
(c) US
(d) SU

Q20. The monetary policy in India is formulated by the _____.
(a) Industrial Finance Corporation of India
(b) Reserve Bank of India
(c) Central Committee
(d) Industrial Development Bank of India

Q21. Which glands help to control blood pressure in the human body?
(a) Adrenal glands
(b) Pituitary glands
(c) Pancreas
(d) Pineal gland

Q22. Eight persons P, Q, R, S, T, U, V and W are sitting in a row facing towards north (not necessarily in the same order). P is the neighbour of W. Only two persons sit between R and Q. Only two persons sit between R and S. V sits third to the right of P. P is the neighbour of Q. T is the neighbour of S but not of V.
Who sits second to the left of V?
(a) U
(b) S
(c) W
(d) T

Q23. If an equilateral triangle has an altitude of length $12\sqrt{5}$ cm, then the difference between the areas of the circumscribed circle and the inscribed circle is :
(a) 246 π cm^2
(b) 244 π cm2

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(c) 242 π cm2
(d) 240 π cm2

Q24. Four letter-clusters have been given, out of which three are alike in some manner and one is different. Select the odd one.
(a) CFI
(b) LOR
(c) RUX
(d) SPM

Q25. Four alphanumeric clusters have been given, out of which three are alike in some manner and one is different. Select the odd one.
(a) A12
(b) P16
(c) U21
(d) M13

Q26. Find the value of $(x + y)^2$, if x = √2+√3over√2-√3 and y = √2-√3over√2+√3.
(a) 25
(b) 36
(c) 225
(d) 100

Q27. In a certain code language, 'she has fever' is written as 'ka qi si' and 'has he that shirt' is written as 'dur ou tu ka'. How will 'has' be written as in that code language?
(a) oi
(b) si
(c) qi
(d) ka

Q28. The Indo-American scientist Har Gobind Khorana won the Noble prize for his contribution in _____.
(a) mathematics
(b) physics
(c) chemistry
(d) genetics

Q29. The latitude which passes through Alwar in Rajasthan also passes through _____.
(a) Himachal Pradesh
(b) Uttarakhand
(c) Haryana
(d) Sikkim

Q30. Swami Dayanand Saraswati founded the Arya Samaj in the year _____.
(a) 1855
(b) 1865
(c) 1875
(d) 1877

Q31. What is the height of the Allahabad pillar which bears inscriptions associated with Samudragupta?
(a) 40 feet
(b) 30 feet
(c) 35 feet
(d) 25 feet

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Q32. Henry Lawrence is associated with the battle of:

(a) Plassey
(b) Chinhat
(c) Haldighati
(d) Chausa

Q33. If A exceeds B by 30% and B is less than C by 20%, then A : C is:

(a) 25 : 52
(b) 10 : 13
(c) 25 : 26
(d) 26 : 25

Q34. If A's income is 60% less than that of B, then by what percentage is B's income more than that of A?

(a) 100%
(b) 150%
(c) 125%
(d) 175%

Q35. Find the mean for the following data. 1.8, 7.5, 9.2, 12.1, 15.4

(a) 9.8
(b) 9.2
(c) 9.7
(d) 9.5

Q36. Which of the following biodiversity hotspots is NOT present in India?

(a) Sundaland
(b) Western Ghats
(c) Wallacea
(d) Indo-Burma

Q37. The number 0.1235235235 in the pover q form is equal to:

(a) 617over4995
(b) 1over12352
(c) 127over12352
(d) 100over12525

Q38. Select the option that is related to the second letter-cluster in the same way as the third letter-cluster is related to the fourth letter-cluster.

? : B/FP :: M/FH : N/FI

(a) C/FQ
(b) A/FO
(c) A/CE
(d) C/FD

Q39. From a group of five students, A, Q, B, S and C, and three teachers D, E and F, a team of five has to be selected on the

basis of the following criteria.

The team must have only one teacher.

Teacher E cannot be on the same team as student Q

Student S cannot be in a team without student A.

Student B and student C cannot be on the same team as student Q.

Based on the given information, which of the following teams will be formed?

(a) CBEDF
(b) ECSQA

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(c) QBSCD
(d) ABSCE

Q40. When was the Global Green Growth Institute (GGGI) established?
(a) 2013
(b) 2012
(c) 2014
(d) 2010

Q41. Sarva Shiksha Abhiyan was launched by _____.
(a) Prime Minister Narendra Modi
(b) Prime Minister PV Narasimha Rao
(c) Prime Minister Atal Bihari Vajpayee
(d) Prime Minister Manmohan Singh

Q42. Find the value of (?) in the following.
$(a^2- b^2) : (a^2- ab) :: (a^3+ b^3) : ?$
(a) $a(a^2+ b^2- 2ab)$
(b) $a(a^2+ 2b^2 - ab)$
(c) $a(a^2+ b^2 - ab)$
(d) $a^2(a + b - 2ab)$

Q43. What is the maximum validity of an ordinance issued by the President of India?
(a) 5 months + 6 weeks
(b) 6 months + 5 weeks
(c) 5 months + 5 weeks
(d) 6 months + 6 weeks

Q44. Who among the following is the Indian actor who was felicitated/honoured by the European Chambers of Commerce on May 17, 2019?
(a) Akshay Kumar
(b) Salman Khan
(c) Anil Kapoor
(d) Aamir Khan

Q45. If the price of oil is increased by 45%, then by what percentage should a family reduce its consumption so that the expenditure remains the same?
(a) 32/29
(b) 11/29
(c) 31/29
(d) 311/29

Q46. Find the least multiple of 13, which, on dividing by 4, 5, 6 7 and 8, leaves a remainder 2 in each case.
(a) 2522
(b) 2824
(c) 2142
(d) 2422

Q47. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statement:

1. All balls are shawls.

2. No shawl is a sweater.

Conclusion:

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I. No ball is a sweater.

II. All shawls are balls.

(a) Only conclusion II follows.
(b) Neither conclusion I nor II follows.
(c) Either conclusion I or II follows.
(d) Only conclusion I follows.

Q48. If 'P + Q' means 'P is the daughter of Q', 'P - Q' means 'P is the wife of Q', 'P × Q' means 'P is the sister of Q' and 'P ÷ Q' means 'P is the father of Q', then what does 'M ÷ N - L' mean?

(a) L is the husband of M's daughter
(b) L is the brother of N's daughter
(c) M is the brother of L's mother
(d) L is the wife of M's son

Q49. Vice president of USA Kamala Harris has roots in the _____ district of Tamilnadu.

(a) Salem
(b) Dindigul
(c) Tiruvarur
(d) Chennai

Q50. What is the average percentage of energy that can be transferred from one trophic level to another trophic level in a food chain?

(a) 1
(b) 5
(c) 10
(d) 50

Q51. Phulkari embroidery is related to the state of _____.

(a) Rajasthan
(b) Punjab
(c) Andhra Pradesh
(d) Gujarat

Q52. Who designed the 'first' small computer for home use?

(a) Chuck Peddle
(b) Steve Wozniak
(c) Steve Leininger
(d) John Blankenbaker

Q53. IBM 370 was a _____ generation computer.

(a) 4^(th)
(b) 3^(rd)
(c) 2^(nd)
(d) 1^(st)

Q54. Find the units digit in the product of (127)^(153) × (341)^(89).

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

Q55. The least five-digit number which is exactly divisible by 9, 12 and 15 is:

(a) 10050
(b) 10080
(c) 10090

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(d) 10060

Q56. India hosted part of the International Army Games for the first time in 2019. In which city were the games held?

(a) Jaisalmer
(b) Pune
(c) Shimla
(d) Hyderabad

Q57. A sum of money doubles at simple interest in 5 years. In how many years will it become four times itself?

(a) 11
(b) 14
(c) 12
(d) 15

Q58. What is the area of the triangle formed by the coordinate axes and the line 2x + 3y = 6?

(a) 2 sq. units
(b) 12 sq. units
(c) 6 sq. units
(d) 3 sq. units

Q59. In which year did the National Social Assistance Plan come into effect?

(a) 1973
(b) 1984
(c) 2004
(d) 1995

Q60. Who among the following was the President of the United Nations General Assembly?

(a) Vijay Laxmi Pandit
(b) Indira Gandhi
(c) Mamata Banerjee
(d) Sushma Swaraj

Q61. If tan α = 5/3 and tan β = 4, then α + β is:

(a) 125º
(b) 145º
(c) 160º
(d) 135º

Q62. Find the value of tan(255°)

(a) √3
(b) 2√3
(c) 2+√3
(d) √3over2

Q63. ENIAC, the first electronics digital programmable computer device (1943), stands for _____.

(a) Electronic Numerical Integrator and Analytical Computer
(b) Electronic Network Integrator and Computer
(c) Electronic Numerical Integrator and Computer
(d) Electronic Numerical Interactive and Computer

Q64. The LCM and HCF of two numbers is 2400 and 20, respectively. When we divide the first number by 8, the quotient 60. then the second number is :

(a) 400
(b) 100
(c) 600

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(d) 300

Q65. Sinhagad Express, the first double-decker train in India, plies daily between _____.

(a) Mumbai and Kolhapur
(b) Mumbai and Pune
(c) Mumbai and Manmad
(d) Mumbai and Surat

Q66. Select the alphanumeric cluster that can replace the question mark (?) in the following series.
Y88, T84, O79, J73, E66,?

(a) A58
(b) Z52
(c) Z58
(d) A48

Q67. The third proportional to 35 and 15 is:

(a) 5over7
(b) 45over7
(c) 45over17
(d) 4over7

Q68. Gooseberry is a rich source of which vitamin?

(a) Vitamin A
(b) Vitamin C
(c) Vitamin D
(d) Vitamin B

Q69. Find the value of $(p-q)^3+(q-r)^3+(r-p)^3$over$9(p-q)(q-r)(r-p)$.

(a) 2over3
(b) 1over5
(c) 1over4
(d) 1over3

Q70. Which world heritage site was built by King Narasimhadeva I of the Eastern Ganga dynasty?

(a) Sun Temple
(b) Hampi
(c) Sarnath
(d) Lepakshi

Q71. Telegraph plateau is a part of the _____.

(a) Indian Ocean Ridge
(b) North Atlantic Ridge
(c) South Atlantic Ridge
(d) South Pacific Ridge

Q72. Which of the following metals was first used by man?

(a) Magnesium
(b) Silver
(c) Gold
(d) Copper

Q73. Calculate the variance for the following data: 2, 5, 6, 8, 9

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

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(d) 3

Q74. Which of the following publishes the Red List of Threatened Species?

(a) UNEP
(b) WNO
(c) WWF
(d) IUCN

Q75. If A is 55, Z is 11, H is 5 and D is 5, then find the value of A ÷ Z × H - D.

(a) 25
(b) 55
(c) 20
(d) -4

Q76. From a circular sheet of radius 20 cm, three circles of radius 6 cm each are cut off. What is the ratio of the area of uncut to the area of the cut portion?

(a) 73 : 25
(b) 73 : 27
(c) 73 : 37
(d) 73 : 23

Q77. Neap (low) tides occur when:

(a) the earth is centered between the sun and the moon
(b) the sun, the moon and the earth from a right-angled triangle
(c) the sun, the moon and the earth are in the same line
(d) the sun, the moon and the earth form a circle

Q78. Nagaland was declared as a separate state on _____.

(a) 1^(st) December 1964
(b) 1st December 1963
(c) 1st November 1963
(d) 1st November 1964

Q79. Which of the following schedules of the Constitution of India has to be amended for the formation of a new state?

(a) Fourth Schedule
(b) First Schedule
(c) Third Schedule
(d) Second Schedule

Q80. If a^4 + b^4 = 17 and a + b = 1, then the value of a^2b^2 - 2ab is:

(a) 6
(b) 2
(c) 8
(d) 4

Q81. A, B and C complete a task in 8 days. A or B alone can complete the same task in 20 days. In how many days can C alone complete the same task?

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

Q82. The difference between the circumference and the radius of a circle is 37 cm. The area of the circle is:

(a) 154 cm2
(b) 151 cm2
(c) 153 cm2

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(d) 152 cm2

Q83. How many Indian states & Union territory does NH-44 cross?

(a) 5
(b) 9
(c) 12
(d) 7

Q84. Four words have been given, out of which three are alike in some manner and one is different. Select the odd one.

(a) Cold
(b) Glacier
(c) Ice
(d) Snow

Q85. A man and a boy, together, can complete a task in 60 days. Their efficiency is in the ratio of 7 : 5. How many days will the boy alone take to complete the task?

(a) 142
(b) 140
(c) 144
(d) 138

Q86. Four words have been given, out of which three are alike in some manner and one is different. select the odd one.

(a) Potato
(b) Turmeric
(c) Tomato
(d) Ginger

Q87. Select the option that is different from the rest.

(a) RQ, 35
(b) TS, 39
(c) HI, 17
(d) MN, 37

Q88. Select the option that is related to the third number in the same way as the second number is related to the first number:

119 : 17 :: 133 : ?

(a) 11
(b) 13
(c) 19
(d) 15

Q89. Read the given information carefully and answer the question that follows.

There are six teachers in a school, viz. P, Q, R, S, T and U. Since there is no games teacher in the school, each of the teachers is allocated one day for taking games class among six days of the week. There is no class on Sunday. R takes the class on the very next day to that of Q. P takes the class on Friday and S takes the class on Wednesday. T takes the class next day after S.

On which day does U take the class?

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

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Q90. Select the option that is related to the third term in the same way as the second term is related to the first term.

Bandipur National Park : Karnataka :: Dudhwa National Park : ?

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

Q91. Out of the five letter-clusters listed, four are alike in some manner and one is different. Select the odd one.

KP, MN, EV, FT, HS

(a) KP
(b) EV
(c) FT
(d) MN

Q92. In a certain code language, 'VKMD' is written as '55', 'RQEF' is written as '51'. What is the code for 'WZBC' in that code language?

(a) 59
(b) 55
(c) 57
(d) 53

Q93. If an airplane, a helicopter, a boat, a motorbike and a car are known as ‘motorbike’, ‘airplane’, ‘car’, ‘boat’ and ‘helicopter’, respectively, then which of the following floats on water?

(a) Boat
(b) Airplane
(c) Helicopter
(d) Car

Q94. Pointing towards a picture, a man said, “She is my wife’s father-in-law's only son’s daughter”. How is the man related to the girl in the picture?

(a) Father
(b) Mother’s Brother
(c) Brother
(d) Father’s Brother

Q95. Study the following information and answer the given question based on the information.

Aneeta, Suneeta and Vineeta are smart.

Muneeta, Buneeta and Suneeta are dull.

Vineeta, Buneeta and Aneeta are sporty.

Suneeta, Muneeta and Aneeta are tall.

Which of the following persons is neither smart nor tall?

(a) Suneeta
(b) Muneeta
(c) Buneeta
(d) Vineeta

Q96. Identify the number that DOES NOT belong to the following series.

4, 6, 10, 16, 24, 32, 46, 60

(a) 32
(b) 24
(c) 6
(d) 16

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Q97. Select the option that is related to the third term in the same way as the second term is related to the first term.

Dronacharya Award : Sports Coaching :: Dhanwantri Award : ?

(a) Sports Medicine
(b) Physiotherapy
(c) Surgery
(d) Ayurveda

Q98. Select the option that is related to the third term in the same way as the second term is related to the first term.

EJ : JT :: IL : ?

(a) RO
(b) LS
(c) RX
(d) NS

Q99. Read the given statement and conclusions carefully and decide which of the given conclusions logically follow(s) from the statement.

Statement:

Of all the ice creams brands manufactured in India, 'Amulya' brand has the highest sales since last five years. The sales of other ice cream brands fluctuate every year.

Conclusions:

I. The taste of 'Amulya' ice creams is popular among Indian residents.

II. The sales of all other Indian brands of ice creams are known.

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

Q100. Consider the given statement and decide which of the given assumption(s) is/are implicit in the statement.

Statement: Sally wanted to invite Harry over for a good dinner, so she made broccoli soup and apple pie for him.

Assumptions:

I. Harry will accept the dinner invitation.

II. Harry likes broccoli soup and apple pie.

III. Harry doesn't like apple pie too much.

(a) Only assumption II is implicit.
(b) Only assumptions I and II are implicit.
(c) Only assumption I is implicit.
(d) Only assumptions II and III are implicit.

ANSWER KEY

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

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SOLUTIONS

Q1. Answer: (b) Edwin Samuel Montagu

The correct answer is Edwin Samuel Montagu.

Key Points

• Edwin Samuel Montagu was a British Liberal politician.

• He served as the Secretary of State for India from 1917 to 1922.

• Montagu was known for his progressive views on Indian self-governance and played a significant role in the Montagu-Chelmsford Reforms.

• He famously criticized the Rowlatt Act, referring to it as "preventive murder".

Additional Information

• Rowlatt Act

• The Rowlatt Act, officially known as the Anarchical and Revolutionary Crimes Act of 1919, was a legislative act passed by the Imperial Legislative Council in British India.

• It gave the colonial government enormous powers to suppress subversive activities and allowed detention of political prisoners without trial for two years.

• This act was widely opposed by Indian leaders, leading to a nationwide protest known as the Rowlatt Satyagraha led by Mahatma Gandhi.

• The act was eventually repealed in 1922 due to widespread public outrage and opposition.

• Montagu-Chelmsford Reforms

• The Montagu-Chelmsford Reforms were introduced by Edwin Montagu and Lord Chelmsford in 1919.

• The reforms aimed to introduce self-governing institutions gradually to India.

• They led to the Government of India Act 1919, which expanded the participation of Indians in the governance of their country.

• The reforms also introduced a dual system of governance known as 'dyarchy' in the provinces.

Q2. Answer: (b) 20

Given:

A woman sells 78 pencils and gets a profit equal to the selling price of 13 pencils.

Formula Used:

Profit Percentage = (Profit / Cost Price) × 100

Calculation:

Let the selling price of one pencil be S.

Total Selling Price (TSP) of 78 pencils = 78S

Profit = Selling Price of 13 pencils = 13S

Cost Price (CP) of 78 pencils = TSP - Profit

=> CP = 78S - 13S

=> CP = 65S

Profit Percentage = (Profit / Cost Price) × 100

=> Profit Percentage = (13S / 65S) × 100

=> Profit Percentage = (13 / 65) × 100

=> Profit Percentage = 20%

The correct answer is option 2.

Q3. Answer: (c) Palani hills

The correct answer is Palani hills.

Key Points

• Kodaikanal is a famous hill station located in the Palani hills of Tamil Nadu, India.

• The Palani hills are part of the Western Ghats, a mountain range that runs parallel to the western coast of India.

• Kodaikanal is known for its scenic beauty, pleasant climate, and rich biodiversity.

• The hill station is often referred to as the "Princess of Hill stations" and is a popular tourist destination.

Additional Information

• Arunachal hills

• Located in the northeastern part of India, Arunachal hills are part of the Eastern Himalayas.
• They are known for their dense forests, diverse wildlife, and indigenous tribal cultures.
• Important towns in Arunachal hills include Itanagar, Tawang, and Ziro.
• Nilgiri hills
• Situated in the western part of Tamil Nadu, the Nilgiri hills are part of the Western Ghats.
• They are known for their tea plantations, eucalyptus forests, and cool climate.
• Ooty (Udhagamandalam) and Coonoor are popular hill stations in the Nilgiris.
• Seven hills
• The term "Seven hills" often refers to various hill regions around the world, one of the most famous being the seven hills of Rome.
• In India, the term can also refer to Tirumala hills in Andhra Pradesh, which are home to the famous Tirupati Temple.

Q4. Answer: (a) 9

Given:
The equation is: 7X5 + 2Y3 + 8Z7 = 1805
Formula used:
We need to express the given equation as:
7X5 = 700 + 10X + 5
2Y3 = 200 + 10Y + 3
8Z7 = 800 + 10Z + 7
Calculations:
Substituting these into the given equation:
(700 + 10X + 5) + (200 + 10Y + 3) + (800 + 10Z + 7) = 1805
=> 700 + 10X + 5 + 200 + 10Y + 3 + 800 + 10Z + 7 = 1805
=> 1715 + 10X + 10Y + 10Z = 1805
=> 10X + 10Y + 10Z = 1805 - 1715 = 90
=> X + Y + Z = 9
To maximize the value of X, we need to minimize the sum of Y and Z. The smallest possible value for Y and Z is 0.
=> X = 9 - 0 - 0 = 9
Therefore The highest value of X is 9.

Q5. Answer: (b) 47 - 34

The logic followed here is: 1st number - 2nd number = 17.
Option 1) 99 - 82 → 99 - 82 = 17
Option 2) 47 - 34 → 47 - 34 = 13
Option 3) 73 - 56 → 73 - 56 = 17
Option 4) 59 - 42 → 59 - 42 = 17
Hence, the correct answer is "47 - 34".

Q6. Answer: (d) 2.25 litres

Given:
Rinki donates blood thrice in a year, each time 150 millilitres.
Number of years = 5
Formula Used:
Total blood donated in 5 years = Number of donations per year × Amount of blood donated per donation × Number of years
Calculation:
Number of donations per year = 3
Amount of blood donated per donation = 150 ml = 0.15 litres
Number of years = 5
Total blood donated in 5 years = 3 × 0.15 × 5
=> Total blood donated in 5 years = 3 × 0.15 × 5
=> Total blood donated in 5 years = 2.25 litres
The correct answer is option 4.

Q7. Answer: (a) 20 : 15 : 12

Given:

The speed of three bikes is in the ratio of 3 : 4 : 5.

Formula Used:

The ratio of time taken = 1 / Speed ratio

Calculation:

Speed ratio of the bikes = 3 : 4 : 5

Time taken ratio = 1 / 3 : 1 / 4 : 1 / 5

To find a common ratio, we take the LCM of the denominators (3, 4, 5), which is 60.

=> Time taken ratio = 60 / 3 : 60 / 4 : 60 / 5

=> Time taken ratio = 20 : 15 : 12

The correct answer is option 1

Q8. Answer: (d) CaSO4 ? 1/2H2O

The correct answer is CaSO4 ? 1/2H2O.

Key Points

• Plaster of Paris is chemically known as calcium sulfate hemihydrate, represented by the formula CaSO4 ? 1/2H2O.

• It is obtained by heating gypsum (CaSO4 ? 2H2O) to a temperature of about 150°C (302°F).

• Plaster of Paris is a white powder that forms a paste when mixed with water and then hardens into a solid.

• This material is widely used in building, sculpture, and medical applications such as casting broken bones.

Additional Information

• Gypsum (CaSO4 ? 2H2O)

• Gypsum is a soft sulfate mineral composed of calcium sulfate dihydrate.

• It is widely mined and used as a fertilizer and as the main constituent in many forms of plaster, blackboard chalk, and wallboard.

• When heated to about 150°C, gypsum loses water molecules and converts to Plaster of Paris.

• Calcium Sulfate Hemihydrate (CaSO4 ? 1/2H2O)

• It is formed by the partial dehydration of gypsum.

• It can rehydrate to form gypsum when mixed with water, making it useful in various applications where a moldable and hardening material is required.

• Uses of Plaster of Paris

• In construction for coating walls and ceilings.

• In medical applications to make plaster casts to immobilize broken bones.

• In art for sculpting and creating decorative elements.

• In fireproofing products and as a mold material for casting metals and ceramics.

Q9. Answer: (a) 0

Given:

Simplify the expression: 1÷[1-2÷{3-4÷(2+8÷5)}]+1

Formula used:

Follow the BODMAS rule (Brackets, Orders, Division, Multiplication, Addition, and Subtraction) to simplify the expression.

Calculations:

Start with the innermost bracket:

2 + 8 = 10

Now, substitute back into the expression:

1 ÷ [1 - 2 ÷ {3 - 4 ÷ (10 ÷ 5)}] + 1

Next, simplify 10 ÷ 5 = 2, so the expression becomes:

1 ÷ [1 - 2 ÷ {3 - 4 ÷ 2}] + 1

Now, simplify 4 ÷ 2 = 2, so the expression becomes:

1 ÷ [1 - 2 ÷ {3 - 2}] + 1

Simplify inside the braces: 3 - 2 = 1, so the expression becomes:

1 ÷ [1 - 2 ÷ 1] + 1

Now simplify 2 ÷ 1 = 2, so the expression becomes:

1 ÷ [1 - 2] + 1

Simplify inside the brackets: 1 - 2 = -1, so the expression becomes:

1 ÷ (-1) + 1

Simplify 1 ÷ -1 = -1, so the expression becomes:

-1 + 1

=> 0

Therefore The simplified value of the expression is 0.

Q10. Answer: (d) 1/13

Formula used:

HCF of fraction = HCF of numerator / LCM of denominator

Calculation:

We need to reduce the fraction into non-reducible form before applying the formula for HCF or LCM.

12/39 = 4/13

5over13 = 5over13

So, HCF of { 12/39 and 5over13 }

=> HCF of { 4/13 and 5over13 }

=> HCF of {4 and 5} / LCM of {13 and 13}

=> 1 / 13

Hence, the correct answer is 1/13.

Q11. Answer: (b) Steel Authority of India Limited

The correct answer is Steel Authority of India Limited.

Key Points

• Steel Authority of India Limited (SAIL) is one of the largest steel-making companies in India and one of the Maharatnas of India's central public sector enterprises.

• SAIL was founded in 1954 and is headquartered in New Delhi, India.

• In 2019, SAIL launched smart garbage bins made of stainless steel, which are designed to be robust, corrosion-resistant, and easy to maintain.

• These smart garbage bins were introduced as part of SAIL's efforts to contribute to Swachh Bharat Abhiyan (Clean India Mission), an initiative by the Government of India aimed at promoting cleanliness and hygiene across the country.

Additional Information

• Stainless Steel

• Stainless steel is an alloy of iron, chromium, and often nickel, known for its resistance to corrosion and staining.

• It is widely used in various industries including construction, automotive, and household appliances due to its durability and aesthetic appeal.

• Stainless steel is also preferred for making garbage bins because it is easy to clean, maintains hygiene, and has a long lifespan.

• Swachh Bharat Abhiyan

• Launched on October 2, 2014, by Prime Minister Narendra Modi, Swachh Bharat Abhiyan aims to eliminate open defecation and improve solid waste management in urban and rural areas of India.

• The mission's objectives include constructing household-owned and community-owned toilets and establishing an accountable mechanism for monitoring toilet use.

• It is one of the largest cleanliness drives ever organized, with millions of government employees and school students participating in the campaign.

• Smart Garbage Bins

• Smart garbage bins are equipped with sensors that detect the fill level of the bin and send notifications when they need to be emptied.

• These bins can be integrated with waste management systems to optimize waste collection routes and schedules, reducing operational costs and improving efficiency.

• By using smart bins, municipalities can ensure cleaner streets and reduce the risk of overflowing bins, which can lead to health hazards.

• Maharatna Companies

• Maharatna is a status given by the Government of India to select central public sector enterprises (CPSEs) that have shown exceptional performance and have significant operational and financial autonomy.

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• Companies with Maharatna status can invest up to 15% of their net worth in a single project without seeking government approval.

• This status is intended to empower these enterprises to become global giants and drive economic growth.

Q12. Answer: (b) America, 1913

The correct answer is America, 1913.

Key Points

• The Ghadar Party was founded in America in the year 1913.

• The primary objective of the Ghadar Party was to secure India's independence from British rule.

• The founders of the Ghadar Party were Indian immigrants residing in the United States and Canada.

• The party was initially headquartered in San Francisco, California.

Additional Information

• Ghadar Party

• The Ghadar Party was a revolutionary group founded by Indian immigrants in the United States and Canada with the aim of liberating India from British colonial rule.

• The word "Ghadar" means "rebellion" in Urdu and Punjabi, and the party published a newspaper with the same name to propagate revolutionary ideas and rally support for their cause.

• The Ghadar Party was formed by Sohan Singh Bhakna and Lala Har Dayal among other prominent leaders.

• They sought to mobilize the Indian diaspora to support and participate in the struggle for India's independence.

• Key Figures

• Sohan Singh Bhakna: He was one of the founding members and the first president of the Ghadar Party. He played a crucial role in organizing the Indian immigrant community in the U.S. and Canada.

• Lala Har Dayal: He was a key intellectual and leader of the Ghadar Party, known for his eloquent speeches and writings that inspired many Indians to join the revolutionary movement.

• Kartar Singh Sarabha: Another prominent member, he was a young revolutionary who became a symbol of the Ghadar Party's determination and sacrifice for India's freedom.

• Impact and Legacy

• The Ghadar Party's efforts laid the foundation for subsequent revolutionary activities in India and abroad, significantly influencing the Indian independence movement.

• The party's members faced severe persecution and many were imprisoned or executed by British authorities, but their sacrifices continued to inspire future generations of freedom fighters.

• The Ghadar Party is remembered for its commitment to the cause of India's independence and its role in galvanizing the Indian diaspora to contribute to the freedom struggle.

Q13. Answer: (a) square

The correct answer is square.

Key Points

• The majority of Harappan seals were square in shape.

• These seals typically measured around 2x2 centimeters.

• The seals were often made from steatite, a soft stone, which allowed for intricate carvings.

• Harappan seals commonly featured animal motifs and inscriptions in the Harappan script.

Additional Information

• Harappan Civilization

• The Harappan civilization, also known as the Indus Valley Civilization, was one of the world's earliest urban civilizations, flourishing around 2500 BCE in what is now Pakistan and northwest India.

• It is renowned for its advanced urban planning, architecture, and social organization.

• The civilization had a writing system, though the Harappan script remains undeciphered.

• They engaged in trade with distant regions, including Mesopotamia.

• Steatite Seals

• Steatite, also known as soapstone, is a type of metamorphic rock that is soft and can be easily carved.

• Harappan artisans used steatite to create seals, which were then often fired to harden them.

• The seals were used for trade and administrative purposes, possibly to stamp goods or documents.

• Animal Motifs

• Common animals depicted on Harappan seals include unicorns, bulls, elephants, and rhinoceroses.

• These animal motifs could have had symbolic or religious significance.
• The meticulous depiction of these animals suggests a high degree of artistic skill.
• Harappan Script
• The Harappan script is composed of signs and symbols, and it has been found on seals, pottery, and other artifacts.
• Despite numerous attempts, the script has not been deciphered, and its language remains unknown.
• The script is thought to have been used for administrative and possibly ritualistic purposes.

Q14. Answer: (d) Kami Rita Sherpa

The correct answer is Kami Rita Sherpa.

Key Points

• Kami Rita Sherpa is a renowned Sherpa guide from Nepal who holds the record for the most ascents of Mount Everest.
• He reached the summit of Mount Everest for the 24th time on May 21, 2019, setting a world record.
• Kami Rita Sherpa first scaled Everest in 1994 and has been climbing it almost every year since then.
• He has also scaled several other prominent peaks including K2, Cho-Oyu, Manaslu, and Lhotse.

Additional Information

• Mount Everest:
• Mount Everest is the Earth's highest mountain above sea level, located in the Mahalangur Himal sub-range of the Himalayas.
• The international border between Nepal and the Tibet Autonomous Region of China runs across its summit point.
• The current official height of Mount Everest is 8,848.86 meters (29,031.7 feet), recognized by China and Nepal.
• The mountain was first summited by Sir Edmund Hillary of New Zealand and Tenzing Norgay, a Sherpa of Nepal, on May 29, 1953.
• Sherpa People:
• The Sherpa are an ethnic group from the most mountainous region of Nepal, high in the Himalayas.
• They are known for their mountaineering skills and are often employed as guides for expeditions in the Himalayas.
• Sherpas are highly regarded for their ability to navigate the treacherous mountain terrain and their physical endurance at high altitudes.
• Mountaineering Records:
• Setting records in mountaineering often involves multiple ascents of the same peak, demonstrating skill, endurance, and experience.
• Mountaineers like Kami Rita Sherpa play a crucial role in guiding and supporting international climbers on dangerous expeditions.

Q15. Answer: (d) Either I or II Follows.

Given Statements:

1. Some leaves are clouds.
2. Very few pillows are leaves.

The least possible Venn diagram:

Conclusions:

I. Some clouds are pillows. (Not follows, No relation is given)

II. Some clouds are not pillows. (Not follows, No relation is given)

Thus, the correct option is (d) Either conclusion I or II follows.

Hence, the correct answer is "Either conclusion I or II follows."

Here are some conditions of an either-or case:

• The elements in both statements should be the same.
• Both conclusions should be false individually.
• One conclusion should be positive and the other should be negative.

There are mainly two different types of complementary pairs;

• Some + no
• All + some not

Q16. Answer: (b) Filariasis

The correct answer is Filariasis.

Key Points

• Filariasis is a parasitic disease caused by an infection with roundworms of the Filarioidea type.
• It is transmitted to humans through the bites of infected mosquitoes.
• The most common manifestations are lymphatic filariasis, which can lead to elephantiasis, and subcutaneous filariasis.
• In regions where filariasis is common, long-term exposure can cause severe disability and social stigma.

Additional Information

• Pneumonia
• Pneumonia is an infection that inflames the air sacs in one or both lungs.
• It is typically caused by bacteria, viruses, or fungi.
• Symptoms include cough, fever, and difficulty breathing.
• It is not transmitted by mosquitoes.
• Goitre
• Goitre is an abnormal enlargement of the thyroid gland.
• The most common cause is iodine deficiency.
• It is not transmitted by mosquitoes.
• Cholera
• Cholera is an acute diarrheal illness caused by infection of the intestine with Vibrio cholerae bacteria.
• It is typically contracted from contaminated water or food.
• It is not transmitted by mosquitoes.

Q17. Answer: (a) M

The logic followed here is:

Hence, the correct answer is "M".

Q18. Answer: (d) roads

The correct answer is roads.

Key Points

• The Golden Quadrilateral is a highway network connecting India's four major metropolitan cities: Delhi, Mumbai, Chennai, and Kolkata.
• It is one of the largest highway projects in India and the fifth-longest in the world, with a total length of about 5,846 kilometers.
• The project was launched in 2001 under the National Highways Development Project (NHDP) and was completed in 2012.
• This highway network facilitates efficient transportation and economic integration across the country, reducing travel time and vehicle operating costs.

Additional Information

• National Highways Development Project (NHDP)
• The NHDP is a project to upgrade, rehabilitate, and widen major highways in India to international standards.
• It is managed by the National Highways Authority of India (NHAI) and funded by the government of India, international organizations, and private sector investments.
• The NHDP includes several phases, with the Golden Quadrilateral being part of Phase I.
• The primary objective is to improve the efficiency of freight and passenger movement across the country, thus boosting the economy.
• National Highways Authority of India (NHAI)
• NHAI is an autonomous agency of the Government of India, responsible for the management of a network of over 50,000 km of National Highways.
• Established in 1988, it operates under the Ministry of Road Transport and Highways.
• The agency's primary role is to develop, maintain, and manage the National Highways infrastructure in the country.
• NHAI is also involved in the implementation of various road infrastructure projects, including the NHDP.
• Economic Benefits of Improved Road Infrastructure
• Reduced travel time and fuel consumption for vehicles, leading to cost savings for businesses and consumers.
• Enhanced connectivity between cities and rural areas, promoting regional development and access to markets.
• Increased safety and reduction in road accidents due to better road conditions and infrastructure.
• Stimulation of economic activities along the highways, including the growth of logistics, tourism, and retail sectors.

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Q19. Answer: (c) US

The logic followed here is:

Hence, the correct answer is "US".

Q20. Answer: (b) Reserve Bank of India

The correct answer is Reserve Bank of India.

Key Points

• The Reserve Bank of India (RBI) is the central banking institution of India, which controls the issuance and supply of the Indian rupee.

• RBI was established on 1st April 1935, in accordance with the Reserve Bank of India Act, 1934.

• It plays a crucial role in the development strategy of the Government of India.

• The primary objective of the RBI's monetary policy is to maintain price stability while keeping in mind the objective of growth.

Additional Information

• Monetary Policy

• Monetary policy refers to the policy of the central bank aimed at regulating the supply of money and interest rates in the economy to achieve macroeconomic objectives such as controlling inflation, consumption, growth, and liquidity.

• In India, the RBI formulates and implements the monetary policy to ensure financial stability and to achieve the targets set by the government.

• Monetary policy tools include open market operations, the cash reserve ratio, statutory liquidity ratio, and repo rate among others.

• Reserve Bank of India (RBI)

• The RBI also acts as the regulator of the financial system, overseeing the functioning of various financial institutions in India.

• It acts as the banker to the Government of India and the state governments.

• RBI also manages the country's foreign exchange and gold reserves.

• It plays a pivotal role in the development of the financial infrastructure of the country, including the development of the payment and settlement systems.

• Open Market Operations (OMO)

• OMOs are conducted by the RBI to control the money supply in the economy by buying or selling government securities in the open market.

• When the RBI sells government securities, it absorbs liquidity from the market, and when it buys securities, it injects liquidity into the market.

• Repo Rate

• The repo rate is the rate at which the RBI lends short-term money to commercial banks.

• A reduction in the repo rate helps banks get money at a cheaper rate, which in turn can help to lower the interest rates for borrowers.

• Conversely, an increase in the repo rate can help to control inflation by making borrowing more expensive.

Q21. Answer: (a) Adrenal glands

The correct answer is Adrenal gland.

Key Points

• The adrenal glands are small glands located on top of each kidney.

• The adrenal cortex produces several hormones.

• The most important are aldosterone (a mineralocorticoid), cortisol (a glucocorticoid), and androgens and estrogen (sex hormones).

• These hormones help regulate metabolism, immune system, blood pressure, response to stress, and other essential functions.

Additional Information

• Thyroid gland:

• It produces hormones that regulate the body's metabolic rate-controlling like heart, muscle, and digestive function, brain development and bone maintenance.

• Its good functioning depends on a good supply of iodine from the diet.

• Thymus gland:

• The thymus is a lobed organ situated near the heart and, beneath the breastbone.

• It is quite large at the time of birth but it gradually gets reduced with age.

• The thymus provides the micro-environment needed for the maturation & development of T-lymphocytes.

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• The T-lymphocyte cells originate in the bone marrow but migrate or move to the thymus for maturation & development, hence if the thymus gland is removed from the newborn baby T-lymphocyte cells will not form.

• Corpus luteum:

• The follicular cell is known as the corpus luteum.

• The Corpus luteum is a follicular cell and gets filled with a yellow pigment called lutein.

Q22. Answer: (c) W

According to the given information:

Eight persons P, Q, R, S, T, U, V and W are sitting in a row facing towards north (not necessarily in the same order).

1) Only two persons sit between R and Q.

2) Only two persons sit between R and S.

3) P is the neighbour of Q.

4) P is the neighbour of W.

5) V sits third to the right of P. Here case 1 gets eliminate.

6) T is the neighbour of S but not of V.

Thus, final arrangement:

So, W sits second to the left of V.

Hence, the correct answer is "W".

Q23. Answer: (d) 240 π cm2

Given:

Altitude of equilateral triangle = 12√5 cm.

Formula Used:

For an equilateral triangle with side length a:

Height (altitude) = √3/2a

Area of circumscribed circle = π R^2

Area of inscribed circle = π r^2

For an equilateral triangle, R = a/√3

and r = a√3/6

Calculation:

Height = 12√5 cm

√3/2a = 12√5

=> a = (2 × 12√5)/√3

=> a = 24√5/√3 × √3/√3

=> a = (24 √15)/3

=> a = 8√15 cm

R = a/√3 = 8√15/√3 = 8√15/√3 × √3/√3 = (8 √45)/3 = (8 × 3√5)/3 = 8√5 cm

r = a√3/6 = (8√15 × √3)/6 = 8√45/6 = (8 × 3√5)/6 = 4√5 cm

Area of circumscribed circle = πR^2

Area = π × $(8√5)^2$ = π × 64 × 5 = 320π cm^2

Area of inscribed circle = πr^2

Area = π × $(4√5)^2$ = π × 16 × 5 = 80π cm^2

Difference = 320π - 80π = 240π cm^2

The difference between the areas of the circumscribed circle and the inscribed circle is 240π cm^2.

Q24. Answer: (d) SPM

The logic followed here is:

Hence, the correct answer is "SPM".

Q25. Answer: (a) A12

The logic followed here is:

Thus, A12 is the odd one.

Hence, the correct answer is "A12".

Q26. Answer: (d) 100

Given:

$x = (\sqrt{2} + \sqrt{3}) / (\sqrt{2} - \sqrt{3})$

$y = (\sqrt{2} - \sqrt{3}) / (\sqrt{2} + \sqrt{3})$

Formula used:

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

Calculations:

We first calculate x + y:

$x + y = (\sqrt{2} + \sqrt{3}) / (\sqrt{2} - \sqrt{3}) + (\sqrt{2} - \sqrt{3}) / (\sqrt{2} + \sqrt{3})$

Now, find the common denominator:

$x + y = [(\sqrt{2} + \sqrt{3})(\sqrt{2} + \sqrt{3}) + (\sqrt{2} - \sqrt{3})(\sqrt{2} - \sqrt{3})] / [(\sqrt{2} - \sqrt{3})(\sqrt{2} + \sqrt{3})]$

Simplify the numerator:

Numerator $= (\sqrt{2} + \sqrt{3})^2 + (\sqrt{2} - \sqrt{3})^2$

Numerator $= (2 + 2\sqrt{6} + 3) + (2 - 2\sqrt{6} + 3) = 5 + 2\sqrt{6} + 5 - 2\sqrt{6} = 10$

Simplify the denominator:

Denominator $= (\sqrt{2} - \sqrt{3})(\sqrt{2} + \sqrt{3}) = (\sqrt{2})^2 - (\sqrt{3})^2 = 2 - 3 = -1$

$x + y = 10 / -1 = -10$

Now, calculate $(x + y)^2$:

$(x + y)^2 = (-10)^2 = 100$

Therefore The value of $(x + y)^2$ is 100.

Q27. Answer: (d) ka

According to the given information:

So, ‘has’ will be written as "ka".

Hence, the correct answer is "ka".

Q28. Answer: (d) genetics

The correct answer is genetics.

Key Points

• Har Gobind Khorana was an Indo-American scientist who was awarded the Nobel Prize in Physiology or Medicine in 1968.

• He received the prize for his work on the interpretation of the genetic code and its function in protein synthesis.

• His pioneering research helped to understand how nucleotides in nucleic acids control the synthesis of proteins in cells.

• Khorana's work was fundamental in the field of genetics, contributing significantly to molecular biology and biotechnology.

Additional Information

• Genetics:

• Genetics is the study of genes, genetic variation, and heredity in organisms.

• It plays a crucial role in understanding the biological processes that govern the development and functioning of living organisms.

• Genetic research has applications in medicine, agriculture, and numerous other fields.

• Advancements in genetics have led to the development of genetic engineering, gene therapy, and personalized medicine.

• Nobel Prize:

• The Nobel Prize is a set of prestigious international awards given annually in several categories, including Physiology or Medicine, Physics, Chemistry, Literature, and Peace.

• It was established by the will of Alfred Nobel, the inventor of dynamite, in 1895.

• The Nobel Prizes are widely regarded as the most prestigious awards available in their respective fields.

• Protein Synthesis:

• Protein synthesis is the process through which cells build proteins based on the genetic instructions carried by mRNA (messenger RNA).

• The process involves two main stages: transcription (DNA to RNA) and translation (RNA to protein).

• Ribosomes play a key role in translating the genetic code into proteins.

• Molecular Biology:

• Molecular biology is a branch of biology that deals with the molecular basis of biological activity between biomolecules in various systems of a cell.

• This field overlaps with genetics and biochemistry and focuses on understanding the interactions between various cell systems,

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including the interactions of DNA, RNA, and protein synthesis.

Q29. Answer: (d) Sikkim

The correct answer is Sikkim.

Key Points

• Sikkim is a state in northeastern India, located in the Himalayan mountains.

• It shares borders with Tibet in the north and northeast, Bhutan in the east, Nepal in the west, and West Bengal in the south.

• Despite being one of the smallest states in India, Sikkim is known for its biodiversity, including alpine and subtropical climates.

• The latitude passing through Alwar in Rajasthan roughly aligns with the latitude that crosses Sikkim.

Additional Information

• Latitude:

• Latitude is a geographic coordinate that specifies the north-south position of a point on the Earth's surface.

• It is an angular measurement, usually expressed in degrees (°), ranging from 0° at the Equator to 90° (North or South) at the poles.

• Lines of latitude are also known as parallels, and they run parallel to the Equator.

• Longitude:

• Longitude is a geographic coordinate that specifies the east-west position of a point on the Earth's surface.

• It is an angular measurement, usually expressed in degrees (°), ranging from 0° at the Prime Meridian to +180° eastward and -180° westward.

• Lines of longitude are also known as meridians, and they converge at the poles.

• Geographic Coordinates:

• Geographic coordinates are a system used to pinpoint the location of any place on Earth using latitude and longitude.

• This system allows for precise navigation and mapping.

• Coordinates are often given in degrees, minutes, and seconds, or in decimal degrees.

• Himalayan Mountains:

• The Himalayas are a mountain range in Asia, separating the plains of the Indian subcontinent from the Tibetan Plateau.

• The range has some of the planet's highest peaks, including the very highest, Mount Everest in Nepal.

• The Himalayas span five countries: Bhutan, China, India, Nepal, and Pakistan.

• They are a crucial source of rivers and have a significant impact on the climate and ecosystem of the region.

Q30. Answer: (c) 1875

The correct answer is 1875.

Key Points

• Swami Dayanand Saraswati founded the Arya Samaj in the year 1875.

• The Arya Samaj was established in Bombay on 10th April 1875.

• Swami Dayanand Saraswati was a prominent Hindu religious leader and a reformer of the Vedic dharma.

• The Arya Samaj promotes values and practices based on the infallibility of the Vedas.

Additional Information

• Swami Dayanand Saraswati

• Swami Dayanand Saraswati was born on 12th February 1824 in Gujarat, India.

• He was a staunch critic of idolatry and social evils that plagued Hindu society during his time.

• His most influential work is the book "Satyarth Prakash" (The Light of Truth).

• He propagated the idea of going back to the Vedas, which he considered as the true source of knowledge and guidance.

• Arya Samaj

• The Arya Samaj is a Hindu reform movement that promotes values and practices based on the belief in the infallibility of the Vedas.

• It opposes caste discrimination and promotes equal rights for women including education and widow remarriage.

• The motto of Arya Samaj is "Krinvanto Vishwam Aryam" which means "Make the world noble".

• The Arya Samaj has been involved in various social and educational reforms in India.

Q31. Answer: (c) 35 feet

The correct answer is 35 feet.

Key Points

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• The Allahabad pillar is a significant historical artifact that stands 35 feet tall.
• The pillar is renowned for bearing inscriptions associated with Samudragupta, an illustrious ruler of the Gupta Empire.
• These inscriptions provide valuable insights into the reign and achievements of Samudragupta.
• The pillar is made of polished sandstone and is an excellent example of ancient Indian craftsmanship.

Additional Information

• Samudragupta
• Samudragupta was one of the most prominent rulers of the Gupta Empire in ancient India.
• He is often referred to as the "Napoleon of India" due to his military prowess and conquests.
• His reign is considered a golden age in Indian history, marked by significant cultural and political achievements.
• The Allahabad pillar inscriptions elaborate on his various military campaigns and victories.
• Gupta Empire
• The Gupta Empire was an ancient Indian empire that existed approximately from the mid-to-late 3rd century CE to 543 CE.
• It is known for its golden age of Indian culture, economy, and intellectual achievements.
• The period witnessed significant advancements in science, art, literature, and philosophy.
• The Gupta period is also known for its splendid architecture and sculptures.
• Inscriptions
• Inscriptions are writings engraved on hard surfaces like stone or metal, often serving as historical records.
• They can provide valuable information about ancient societies, including their rulers, administrative systems, and cultural practices.
• The inscriptions on the Allahabad pillar are written in a poetic form known as "Prashasti," which means eulogy.
• These inscriptions are crucial for understanding the history and achievements of the Gupta rulers.
• Polished Sandstone
• Polished sandstone is a type of sedimentary rock that has been smoothed and polished to achieve a fine finish.
• It was commonly used in ancient Indian architecture and sculpture for its durability and aesthetic appeal.
• The Allahabad pillar is an excellent example of the use of polished sandstone in ancient Indian craftsmanship.

Q32. Answer: (b) Chinhat

The correct answer is Chinhat.

Key Points

• Henry Lawrence was a British colonial administrator and soldier who played a crucial role during the Indian Rebellion of 1857.
• He is most famously associated with the Battle of Chinhat, which took place on June 30, 1857.
• The battle was fought between the British forces led by Henry Lawrence and the rebels near the village of Chinhat, close to Lucknow.
• Despite a valiant effort, the British forces were defeated in this battle, leading to the Siege of Lucknow where Henry Lawrence was mortally wounded.

Additional Information

• Battle of Plassey:
• The Battle of Plassey was fought on June 23, 1757, between the British East India Company and the Nawab of Bengal, Siraj-ud-Daulah.
• This battle marked the beginning of British rule in India.
• Battle of Haldighati:
• The Battle of Haldighati was fought on June 18, 1576, between the forces of Maharana Pratap and the Mughal army led by Man Singh I of Amber.
• It is one of the most celebrated battles in Rajput history.
• Battle of Chausa:
• The Battle of Chausa was fought on June 26, 1539, between the Mughal Emperor Humayun and Sher Shah Suri.
• Humayun was defeated, and Sher Shah Suri established the Suri Empire.

Q33. Answer: (d) 26 : 25

Given:

A exceeds B by 30%.

B is less than C by 20%.

Formula Used:

Let B = 100
A = B + 30% of B
C = B / (1 - 0.20)
A : C
Calculation:
Let B = 100
A = 100 + 30% of 100
A = 100 + 30
A = 130
C = 100 / (1 - 0.20)
C = 100 / 0.80
C = 125
A : C = 130 : 125
Simplify the ratio:
A : C = 26 : 25
The correct answer is option 4.

Q34. Answer: (b) 150%

Given:
A's income is 60% less than that of B.
Formula Used:
Percentage increase = ((Difference in income)/(Income of A)) × 100
Calculation:
Let B's income be 100 units.
A's income = 100 - 60\% of 100
A's income = 100 - 60
A's income = 40
Difference in income = 100 - 40 = 60
Percentage increase => (60/40) × 100
Percentage increase => 1.5 × 100
Percentage increase => 150%
The percentage by which B's income is more than A's income is 150%.

Q35. Answer: (b) 9.2

Given:
Data: 1.8, 7.5, 9.2, 12.1, 15.4
Formula Used:
Mean = (Sum of all data values) / (Number of data values)
Calculation:
Sum of all data values = 1.8 + 7.5 + 9.2 + 12.1 + 15.4
Sum = 1.8 + 7.5 + 9.2 + 12.1 + 15.4
Sum = 46.0
Number of data values = 5
Mean = Sum / Number of data values
Mean = 46.0 / 5
Mean = 9.2
The mean for the given data is 9.2.

Q36. Answer: (c) Wallacea

The correct answer is Wallacea.
Key Points
• Wallacea is a biodiversity hotspot that includes islands in Indonesia and is not found in India.
• The region is named after Alfred Russel Wallace, a British naturalist who independently conceived the theory of evolution

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through natural selection.

• Wallacea is known for its unique flora and fauna, including many endemic species that are not found anywhere else in the world.

• This biodiversity hotspot is located between the Asian and Australian continental plates, leading to a mix of species from both regions.

Additional Information

• Biodiversity Hotspots

• Biodiversity hotspots are regions with a high level of endemic species that are under significant threat from human activities.

• There are 36 recognized biodiversity hotspots worldwide, each holding at least 1,500 species of vascular plants as endemics and having lost at least 70% of its original habitat.

• These areas are critical for conservation efforts as they contain a large proportion of the world's biodiversity in a relatively small area.

• Sundaland

• Sundaland includes the Malay Peninsula, Borneo, Sumatra, Java, and the surrounding small islands.

• It is one of the most biologically diverse regions in the world and is part of the Indo-Malayan realm.

• Western Ghats

• The Western Ghats are a mountain range that runs parallel to the western coast of India.

• This region is known for its rich biodiversity, including many endemic species of plants and animals.

• It is one of the eight "hottest hotspots" of biological diversity in the world.

• Indo-Burma

• The Indo-Burma region extends across parts of northeastern India, Myanmar, Thailand, Cambodia, Laos, and Vietnam.

• It is one of the most biologically diverse areas in the world, with a high number of endemic species.

• This hotspot faces significant threats from habitat destruction and fragmentation.

Q37. Answer: (a) 617over4995

Given:

The number is 0.1235235235.

Formula Used:

Convert repeating decimals to fractions.

Calculation:

Let x = 0.1235235235...

Multiplying by 1000 to shift the decimal point three places to the right:

1000x = 123.5235235235...

Subtracting the original equation from this new equation:

1000x - x = 123.5235235235... - 0.1235235235...

=> 999x = 123.4

=> x = 123.4 / 999

To simplify the fraction, multiply both numerator and denominator by 10 to get rid of the decimal point:

=> x = 1234 / 9990

=> x = 617 / 4995

The number 0.1235235235 in the p/q form is equal to 617/4995.

Q38. Answer: (b) A/FO

The logic followed here is:

? : B/FP

Similarly, M/FH : N/FI

Hence, the correct answer is "A/FO".

Q39. Answer: (d) ABSCE

According to the given information:

1) The team must have only one teacher.

2) Teacher E cannot be on the same team as student Q.

3) Student S cannot be in a team without student A.

3) Student B and student C cannot be on the same team as student Q.

Teacher	Students
E	A, B, S, C
F	Q
D	A, B, S, C

Option 1) CBEDF → Does not formed (The team must have only one teacher. Here D and E both teachers are in same team)

Option 2) ECSQA → Does not formed (Teacher E cannot be on the same team as student Q. Here E and Q both are in same team)

Option 3) QBSCD → Does not formed (Student S cannot be in a team without student A. Here A is missing in same team)

Option 4) ABSCE - Formed.

Based on the given information, teams ABSCE will be formed.

Hence, the correct answer is "ABSCE".

Q40. Answer: (d) 2010

The correct answer is 2010.

Key Points

• The Global Green Growth Institute (GGGI) was established in 2010.

• GGGI is an international organization dedicated to supporting and promoting strong, inclusive, and sustainable economic growth in developing countries and emerging economies.

• It was initially founded as a think tank in South Korea and later transformed into an intergovernmental organization.

• The headquarters of GGGI is located in Seoul, South Korea.

Additional Information

• Global Green Growth Institute (GGGI)

• GGGI was established to support developing countries and emerging economies in achieving sustainable economic growth through green growth policies and strategies.

• It focuses on various sectors including energy, water, land use, and green cities to promote sustainable development and tackle climate change.

• The organization works in close collaboration with governments, private sector, and international organizations to implement green growth projects and policies.

• GGGI provides technical support, knowledge sharing, and capacity building to help countries transition to a green economy.

• Green Growth

• Green growth refers to fostering economic growth and development while ensuring that natural resources continue to provide the resources and environmental services on which our well-being relies.

• It involves promoting growth and development while reducing pollution and greenhouse gas emissions, minimizing waste and inefficient use of natural resources, maintaining biodiversity, and strengthening energy security.

• Green growth strategies aim to achieve a balance between economic development and environmental sustainability.

• Intergovernmental Organizations

• Intergovernmental organizations (IGOs) are entities created by treaty, involving two or more nations, to work in good faith, on issues of common interest.

• Examples of IGOs include the United Nations, the World Bank, and the European Union.

• IGOs help in addressing global issues such as climate change, human rights, and economic development through cooperation and coordinated efforts among member countries.

• Sustainable Development

• Sustainable development is the organizing principle for meeting human development goals while simultaneously sustaining the ability of natural systems to provide the natural resources and ecosystem services on which the economy and society depend.

• It aims to achieve a balance between economic growth, environmental protection, and social equity.

• The concept of sustainable development was popularized by the Brundtland Commission's report in 1987, which defined it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Q41. Answer: (c) Prime Minister Atal Bihari Vajpayee

The correct answer is Prime Minister Atal Bihari Vajpayee.

Key Points

• Prime Minister Atal Bihari Vajpayee launched the Sarva Shiksha Abhiyan (SSA) in 2001.

• It aimed at the universalization of elementary education by providing free and compulsory education to children between the

ages of 6 to 14 years.

• The SSA was one of the largest education initiatives undertaken by the Indian government.

• It focused on bridging gender and social category gaps in education at the elementary level.

Additional Information

• Right to Education (RTE) Act

• The Right to Education Act was enacted on August 4, 2009, and came into effect on April 1, 2010.

• It mandates free and compulsory education for children between the ages of 6 and 14 years under Article 21A of the Indian Constitution.

• RTE emphasizes the importance of quality education and the need to eliminate discrimination in schools.

• The act also outlines the minimum norms and standards for schools to ensure proper infrastructure and learning environments.

• Mid-Day Meal Scheme

• Launched on August 15, 1995, the Mid-Day Meal Scheme aims to enhance enrollment, retention, and attendance of children in schools.

• It provides free lunches to students in primary and upper primary classes in government and government-aided schools.

• The scheme has had a significant impact on improving the nutritional status of children and encouraging regular attendance.

• This initiative is an important step towards ensuring that children from underprivileged backgrounds receive at least one nutritious meal a day.

• National Programme for Education of Girls at Elementary Level (NPEGEL)

• NPEGEL is a component of SSA that focuses on reducing the gender gap in education.

• It targets girls in educationally backward blocks and provides additional support to ensure their enrollment, retention, and completion of elementary education.

• The program includes community mobilization, provision of incentives, and creating girl-friendly learning environments.

• NPEGEL plays a crucial role in promoting gender equality and empowering girls through education.

• Kasturba Gandhi Balika Vidyalaya (KGBV)

• Launched in 2004, KGBV is a scheme under SSA that establishes residential schools for girls from disadvantaged groups.

• It aims to provide quality education to girls from marginalized communities, especially in rural areas.

• KGBV focuses on the holistic development of girls, including academic, social, and vocational skills.

• The scheme has been instrumental in increasing the enrollment and retention of girls in schools.

Q42. Answer: (c) $a(a^2+ b^2 - ab)$

Given:

The proportion is: $(a^2 - b^2) : (a^2 - ab) :: (a^3 + b^3) : ?$

Formula used:

The given proportion can be written as:

$(a^2 - b^2) / (a^2 - ab) = (a^3 + b^3) / ?$

Calculations:

Using the difference of squares identity: $a^2 - b^2 = (a - b)(a + b)$

So, $(a^2 - b^2) = (a - b)(a + b)$.

Now, rewrite the proportion:

$((a - b)(a + b)) / (a^2 - ab) = (a^3 + b^3) / ?$

Use the sum of cubes identity: $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

So, $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$.

Now, substitute this into the proportion:

$((a - b)(a + b)) / (a^2 - ab) = (a + b)(a^2 - ab + b^2) / ?$

Cancel out $(a + b)$ from both sides:

$(a - b) / (a^2 - ab) = (a^2 - ab + b^2) / ?$

Now, cross-multiply to find ?:

$? = (a^2 - ab) \times (a^2 - ab + b^2) / (a - b)$

Therefore The value of ? is $(a^2 - ab) \times (a^2 - ab + b^2) / (a - b)$.

Now, let's compare the options:

After simplifying the expressions, the correct value of ? is:

Option 3: $a(a^2 + b^2 - ab)$

Q43. Answer: (d) 6 months + 6 weeks

The correct answer is 6 months + 6 weeks.

Key Points

• An ordinance issued by the President of India is a temporary law that has the same force and effect as an act of Parliament.

• The President can issue an ordinance only when both houses of Parliament are not in session.

• An ordinance ceases to operate if it is not approved by both houses of Parliament within six weeks of their reassembly.

• The maximum validity of an ordinance is six months (the maximum gap between two sessions of Parliament) plus six weeks (time allowed for Parliament to ratify the ordinance).

Additional Information

• Ordinance:

• An ordinance is a decree or law promulgated by the President of India on the advice of the Union Cabinet.

• It has the same force and effect as an act of Parliament but is temporary in nature.

• Parliament Sessions:

• The Parliament of India conducts its business in three sessions: the Budget Session, the Monsoon Session, and the Winter Session.

• The maximum gap between two sessions can be six months.

• Reassembly of Parliament:

• Once both houses of Parliament reassemble, the ordinance must be laid before them.

• It must be approved by both houses within six weeks, failing which it will cease to operate.

Q44. Answer: (c) Anil Kapoor

The correct answer is Anil Kapoor.

Key Points

• Anil Kapoor is a prominent Indian actor and producer known for his works in Bollywood.

• He has been honored with several awards for his contributions to Indian cinema, including six Filmfare Awards and two National Film Awards.

• On May 17, 2019, Anil Kapoor was felicitated by the European Chambers of Commerce for his exceptional contribution to Indian cinema and his influence on international cinema.

• His career has spanned over four decades, and he has appeared in more than 100 films, including international projects like "Slumdog Millionaire" and the TV series "24".

Additional Information

• European Chambers of Commerce:

• The European Chambers of Commerce are organizations that represent the interests of businesses in Europe.

• They provide a platform for businesses to collaborate, share best practices, and advocate for policies that promote economic growth and development.

• These chambers often recognize and honor individuals and organizations that have made significant contributions to their respective fields.

• Bollywood:

• Bollywood is the Indian Hindi-language film industry based in Mumbai (formerly Bombay).

• It is one of the largest film industries in the world in terms of the number of films produced and tickets sold.

• Bollywood is known for its vibrant music, colorful dance sequences, and diverse storytelling.

• Slumdog Millionaire:

• Slumdog Millionaire is a 2008 British drama film directed by Danny Boyle.

• The film is based on the novel "Q & A" by Indian author Vikas Swarup.

• It won eight Academy Awards, including Best Picture, Best Director, and Best Adapted Screenplay.

• Anil Kapoor played the role of the game show host in the film.

• Filmfare Awards:

• The Filmfare Awards are one of the most prestigious film awards in India.

• They were first introduced in 1954 by The Times Group to honor artistic and technical excellence in the Hindi-language film industry.

• Anil Kapoor has won multiple Filmfare Awards throughout his career.

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Q45. Answer: (d) 311/29

Given:

The price of oil is increased by 45%.

Formula used:

Expenditure = Price × Consumption

After the price increase, the new price becomes 1.45 × P, and we want the new expenditure to remain the same.

Calculations:

The new consumption is C' = C / 1.45.

The percentage decrease in consumption is (1 - 1 / 1.45) × 100 = 31 (1/29)%.

Therefore The family should reduce its consumption by 31 (1/29)% to keep the expenditure the same.

Q46. Answer: (a) 2522

Given:

The number is a multiple of 13, and when divided by 4, 5, 6, 7, and 8, leaves a remainder of 2 in each case.

Solution:

The number N - 2 must be a multiple of the LCM of 4, 5, 6, 7, and 8, which is 840.

Thus, N = 840k + 2.

Now, we find the smallest k such that N is divisible by 13.

We find k = 3, so the least value of N is 2522.

Therefore The least multiple of 13 is 2522.

Q47. Answer: (d) Only conclusion I follows.

Statement:

1. All balls are shawls.

2. No shawl is a sweater.

The least possible Venn diagram:

Conclusion:

I. No ball is a sweater. - True (because All balls are shawls and No shawl is a sweater. So, No ball is a sweater, it is definite)

II. All shawls are balls. - False (because All balls are shawls, so, Some shawls are balls it is definite but All shawls are balls it cannot be possible)

So, Only conclusion I follows.

Hence, the correct answer is "Only conclusion I follows."

Q48. Answer: (a) L is the husband of M's daughter

Family Chart:

Decoding the Symbols:

Symbol	•	•	×	÷
Meaning	Daughter	Wife	Sister	Father

Given: M ÷ N - L

It means: M is the father of N and N is the wife of L.

So, L is the husband of M's daughter.

Hence, the correct answer is "L is the husband of M's daughter.'

Q49. Answer: (c) Tiruvarur

The correct answer is Tiruvarur.

Key Points

• Kamala Harris, the Vice President of the USA, has her maternal roots in the district of Tiruvarur in Tamil Nadu, India.

• Her mother, Shyamala Gopalan, was born in Chennai, but her family hails from Thulasenthirapuram, a village in Tiruvarur.

• Thulasenthirapuram is a small village that has gained international recognition due to Kamala Harris's political success.

• The village celebrated her election victory with traditional Indian festivities, highlighting the strong connection between Kamala Harris and her Indian heritage.

Additional Information

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• Kamala Harris

• Kamala Devi Harris is the 49th Vice President of the United States, making history as the first female Vice President, the highest-ranking female official in U.S. history, and the first African American and first Asian American Vice President.

• She was born on October 20, 1964, in Oakland, California, USA.

• Prior to her vice-presidency, Kamala Harris served as the junior United States senator from California from 2017 to 2021 and as the Attorney General of California from 2011 to 2017.

• She is a member of the Democratic Party and was elected Vice President alongside President Joe Biden in the 2020 election.

• Tiruvarur District

• Tiruvarur is a district in the Indian state of Tamil Nadu, known for its rich cultural heritage and history.

• The district is renowned for the Thyagaraja Temple, a Hindu temple dedicated to Lord Shiva, and its annual chariot festival.

• Tiruvarur is also famous for being the birthplace of the Carnatic music trinity: Thyagaraja, Muthuswami Dikshitar, and Syama Sastri.

• The district is agriculturally significant, with paddy being the predominant crop grown in the region.

• Indian Heritage and Diaspora

• India has a vast and diverse heritage, with numerous cultural, historical, and traditional elements contributing to its rich tapestry.

• The Indian diaspora is one of the largest in the world, with millions of people of Indian origin living abroad and contributing to various fields globally.

• Individuals like Kamala Harris, who have Indian roots, often maintain strong cultural connections to their heritage, celebrating Indian festivals, traditions, and values.

• This global presence of the Indian community highlights the impact of Indian culture and heritage worldwide.

Q50. Answer: (c) 10

The correct answer is 10.

Key Points

• The average percentage of energy that can be transferred from one trophic level to another in a food chain is approximately 10%.

• This concept is known as the 10% law of energy transfer, which was put forward by Raymond Lindeman in 1942.

• According to this law, when energy is passed in an ecosystem from one trophic level to the next, only about 10% of the energy is transferred.

• The remaining 90% of energy is lost in various forms such as heat, respiration, and excretion.

Additional Information

• Trophic Levels:

• Trophic levels refer to the different positions that organisms occupy in a food chain.

• Primary producers (plants) are at the first trophic level, herbivores at the second, primary carnivores at the third, and so on.

• Each level represents a step in the flow of energy and nutrients.

• Energy Pyramid:

• An energy pyramid is a graphical representation of the energy flow in a community.

• The pyramid is typically broad at the base and narrows towards the top, indicating the decreasing amount of energy available at each successive trophic level.

• This decrease follows the 10% law of energy transfer.

• Biomass:

• Biomass refers to the total mass of living organisms in a given area or ecosystem at a particular time.

• It is often used as a measure of energy available at each trophic level.

• Like energy, biomass also decreases with each ascending trophic level in a food chain.

• Ecological Efficiency:

• Ecological efficiency is the efficiency with which energy is transferred from one trophic level to the next.

• It is typically low, around 10%, meaning that 90% of the energy is lost at each step.

• This inefficiency limits the number of trophic levels in an ecosystem.

Q51. Answer: (b) Punjab

The correct answer is Punjab.

Key Points

• Phulkari embroidery is a traditional folk art form that originated in the state of Punjab.

• It is characterized by intricate and colorful floral patterns, traditionally embroidered on shawls, dupattas, and other garments.

• The word 'Phulkari' translates to 'flower work', which reflects the floral designs that are predominant in this embroidery style.

• Phulkari is usually done on handwoven plain cloth using silk threads, and the designs are created using a variety of stitches, especially the darn stitch.

Additional Information

• Embroidery

• Embroidery is the craft of decorating fabric or other materials using a needle to apply thread or yarn.

• Embroidery may also incorporate other materials such as pearls, beads, quills, and sequins.

• It is an ancient craft that has been practiced across different cultures and civilizations throughout history.

• Various techniques and stitches are used in embroidery, such as cross-stitch, chain stitch, satin stitch, and more.

• Traditional Indian Textiles

• India is known for its rich heritage of textiles, including various traditional forms of weaving, printing, and embroidery.

• Some of the well-known traditional textiles include Banarasi silk, Kanchipuram silk, Chanderi, Bandhani, and Ikat.

• Each region in India has its unique textile traditions that reflect the local culture, history, and resources.

• These textiles are often used in the making of sarees, salwar kameez, shawls, and other garments, as well as home decor items.

• Phulkari Revival

• In recent years, there has been a revival of Phulkari embroidery, with designers and artisans working to preserve and promote this traditional art form.

• Phulkari is now used in modern fashion, including contemporary clothing, accessories, and home decor items.

• Various initiatives and organizations are supporting artisans and providing platforms for showcasing Phulkari work.

• This revival not only preserves the cultural heritage but also provides livelihood opportunities for artisans in Punjab.

Q52. Answer: (d) John Blankenbaker

The correct answer is John Blankenbaker.

Key Points

• John Blankenbaker designed the first small computer intended for home use, known as the Kenbak-1.

• The Kenbak-1 was introduced in 1971 and is considered one of the first personal computers.

• It used discrete transistor logic and had 256 bytes of memory.

• The Kenbak-1 was advertised for $750 and was primarily used for educational purposes.

Additional Information

• Chuck Peddle

• Chuck Peddle was an influential engineer who developed the MOS Technology 6502 microprocessor.

• The 6502 was used in several early personal computers, including the Apple I and II, Commodore PET, and Atari 8-bit family.

• Steve Wozniak

• Steve Wozniak is a co-founder of Apple Inc. and the designer of the Apple I and Apple II computers.

• The Apple II, launched in 1977, was one of the first highly successful mass-produced personal computers.

• Steve Leininger

• Steve Leininger was an engineer at Tandy Corporation who co-designed the TRS-80, one of the first mass-produced personal computers.

• The TRS-80 was introduced in 1977 and was one of the best-selling personal computers of its time.

• John Blankenbaker

• John Blankenbaker is credited with designing the Kenbak-1, which is considered the first commercially available personal computer.

• The Kenbak-1 was a simple machine that used switches and lights for input and output.

Q53. Answer: (b) 3^(rd)

The correct answer is 3rd generation computer.

Key Points

• IBM 370 series, introduced in 1970, belongs to the 3rd generation of computers.

• 3rd generation computers used Integrated Circuits (ICs) to replace transistors, leading to more compact and efficient systems.

• These computers were characterized by the use of semiconductor memory and operating systems capable of multitasking and time-sharing.

• IBM 370 was known for being one of the first computers to support virtual memory, which allowed for more efficient processing and use of resources.

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Additional Information

• First Generation Computers (1940-1956)
• These computers used vacuum tubes for circuitry and magnetic drums for memory.
• They were very large, consumed a lot of power, and produced a lot of heat.
• Examples include ENIAC, UNIVAC.
• Second Generation Computers (1956-1963)
• These computers used transistors instead of vacuum tubes, making them smaller, faster, and more reliable.
• They also used magnetic core memory.
• Examples include IBM 1401 and IBM 7090.
• Third Generation Computers (1964-1971)
• Integrated Circuits (ICs) were used in these computers, which significantly increased the speed and efficiency.
• They also introduced operating systems and multiprogramming.
• Examples include IBM 360 and IBM 370.
• Fourth Generation Computers (1971-Present)
• These computers use microprocessors, which contain thousands of integrated circuits on a single silicon chip.
• They are characterized by the development of personal computers (PCs).
• Examples include Apple II, IBM PC.
• Fifth Generation Computers (Present and Beyond)
• These computers are based on artificial intelligence and use parallel processing and superconductors.
• They aim to develop devices that respond to natural language input and are capable of learning and self-organization.
• Examples include AI systems, advanced robotics.

Q54. Answer: (b) 7

Given:

We need to find the units digit of the product (127)^(153) × (341)^(89).

Formula used:

The units digit of a product depends only on the units digits of the individual factors. So, we need to focus on the units digits of 127 and 341.

The units digit of 127 is 7, and the units digit of 341 is 1.

Calculations:

We need to find the units digit of:

(7)^(153) × (1)^(89)

First, since the units digit of 1 raised to any power is always 1, we only need to focus on the units digit of 7^(153).

Now, let's observe the pattern in the units digits of powers of 7:

$7^1 = 7$ (units digit is 7)

$7^2 = 49$ (units digit is 9)

$7^3 = 343$ (units digit is 3)

7^4 = 2401 (units digit is 1)

As we can see, the units digits of powers of 7 repeat in a cycle of length 4: 7, 9, 3, 1.

Now, we need to find the remainder when 153 is divided by 4 (the length of the cycle):

153 ÷ 4 = 38 remainder 1

So, 7^(153) has the same units digit as 7^1, which is 7.

Now, multiply the units digits of 7^(153) and 1^(89):

7 × 1 = 7

Therefore The units digit of the product (127)^(153) × (341)^(89) is 7.

Q55. Answer: (b) 10080

Given:

We need to find the least five-digit number which is exactly divisible by 9, 12, and 15.

Formula Used:

Find the Least Common Multiple (LCM) of the given numbers.

Calculation:

Prime factorization of 9 = 3^2

Prime factorization of 12 = $2^2 \times 3$

Prime factorization of 15 = 3×5

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

LCM = $4 \times 9 \times 5$

LCM = 180

The least five-digit number is 10000.

To find the least five-digit number divisible by 180:

=> $10000 \div 180 \approx 55.55$

=> $56 \times 180 = 10080$

The least five-digit number which is exactly divisible by 9, 12, and 15 is 10080.

Q56. Answer: (a) Jaisalmer

The correct answer is Jaisalmer.

Key Points

• Jaisalmer is a city in the Indian state of Rajasthan, known for its golden sand dunes and historic forts.

• The International Army Games is an annual event organized by the Ministry of Defense of the Russian Federation, involving various military competitions.

• In 2019, India hosted a part of these games for the first time, and the event was held in the city of Jaisalmer.

• The event in Jaisalmer saw participation from multiple countries, showcasing their military strength and skills in different competitions.

Additional Information

• International Army Games

• The International Army Games is an annual military sports event organized by the Russian Ministry of Defense since 2015.

• It includes various competitions like tank biathlon, sniper frontier, and engineering formula among others.

• The games aim to foster military cooperation and exchange of expertise among participating countries.

• Countries from around the world, including China, Iran, and India, have participated in these games.

• Jaisalmer

• Jaisalmer, also known as the "Golden City," is famous for its yellow sandstone architecture, including the Jaisalmer Fort, a UNESCO World Heritage Site.

• It is located in the heart of the Thar Desert and is a popular tourist destination in Rajasthan.

• The city is known for its vibrant culture, traditional crafts, and the Desert Festival held annually.

• Jaisalmer's strategic location and desert terrain make it an ideal location for military training and exercises.

Q57. Answer: (d) 15

Given:

A sum of money doubles at simple interest in 5 years.

Formula Used:

Simple Interest (SI) = P × R ×T / 100

Amount (A) = Principal (P) + Simple Interest (SI)

Calculation:

Let the principal amount be P.

After 5 years, the amount doubles, so:

A = 2P

Simple Interest (SI) for 5 years is:

SI = A - P = 2P - P = P

Using the formula for Simple Interest:

P = P × R × 5 / 100

=> R = 20%

We need to find the time T in which the amount becomes four times:

A = 4P

Simple Interest (SI) for this period is:

SI = A - P = 4P - P = 3P

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Using the formula for Simple Interest:

3P = P × 20 × T / 100

=> 3P = P × 20T / 100

=> 3 = 20T / 100

=> T = 15 years

The sum of money will become four times itself in 15 years.

Q58. Answer: (d) 3 sq. units

Given:

The equation of the line: 2x + 3y = 6

Formula Used:

Area of the triangle formed by the coordinate axes and the line = (1/2) × base × height

Calculation:

The line intersects the x-axis when y = 0:

=> 2x + 3(0) = 6

=> 2x = 6

=> x = 3

So, the x-intercept is 3.

The line intersects the y-axis when x = 0:

=> 2(0) + 3y = 6

=> 3y = 6

=> y = 2

So, the y-intercept is 2.

Area of the triangle = (1/2) × base × height

=> Area = (1/2) × 3 × 2

=> Area = (1/2) × 6

=> Area = 3

The area of the triangle is 3 sq. units.

Q59. Answer: (d) 1995

The correct answer is 1995.

Key Points

• The National Social Assistance Plan (NSAP) was launched in August 1995.

• It provides social assistance benefits to poor households in the form of pensions and family benefit schemes.

• The plan includes schemes like the Indira Gandhi National Old Age Pension Scheme (IGNOAPS), the Indira Gandhi National Widow Pension Scheme (IGNWPS), and the Indira Gandhi National Disability Pension Scheme (IGNDPS).

• The objective of NSAP is to ensure a minimum national standard for social assistance in addition to the benefits that states are currently providing or might provide in the future.

Additional Information

• Indira Gandhi National Old Age Pension Scheme (IGNOAPS)

• It is a non-contributory pension scheme for persons above 60 years of age who belong to a below poverty line (BPL) family.

• The pension amount varies from state to state, with a minimum of Rs. 200 per month for individuals aged 60-79 and Rs. 500 for individuals aged 80 and above.

• Indira Gandhi National Widow Pension Scheme (IGNWPS)

• This scheme provides a pension to widows aged 40-59 years who belong to BPL families.

• Under this scheme, a monthly pension of Rs. 300 is provided, which can vary based on the state government's contributions.

• Indira Gandhi National Disability Pension Scheme (IGNDPS)

• It provides pension to individuals aged 18-59 years with severe or multiple disabilities who belong to BPL families.

• The scheme offers a monthly pension of Rs. 300, which can be supplemented by the state government.

• National Family Benefit Scheme (NFBS)

• This scheme provides a lump sum family benefit of Rs. 20,000 to the bereaved household in case of the death of the primary breadwinner aged between 18-59 years belonging to a BPL family.

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Q60. Answer: (a) Vijay Laxmi Pandit

The correct answer is Vijay Laxmi Pandit.

Key Points

• Vijay Laxmi Pandit was an Indian diplomat and politician, renowned for being the first woman President of the United Nations General Assembly.

• She was elected as the President of the 8th session of the United Nations General Assembly in 1953.

• Vijay Laxmi Pandit was the sister of India's first Prime Minister, Jawaharlal Nehru, and played a significant role in India's freedom struggle.

• She had an illustrious career, serving as India's ambassador to various countries and making significant contributions to international diplomacy.

Additional Information

• United Nations General Assembly (UNGA)

• The UNGA is one of the six principal organs of the United Nations (UN), serving as its main deliberative, policymaking, and representative organ.

• All 193 member states of the UN are represented in the General Assembly, making it the only UN body with universal representation.

• The General Assembly meets in regular yearly sessions, but special and emergency sessions can also be called.

• Its functions and powers are outlined in Chapter IV of the United Nations Charter and include overseeing the budget of the UN, appointing the non-permanent members to the Security Council, receiving reports from other parts of the UN, and making recommendations in the form of General Assembly Resolutions.

• Role of the President of the UN General Assembly

• The President of the UN General Assembly is elected annually by the assembly to serve a one-year term of office.

• The President's duties include overseeing the work of the General Assembly, representing the Assembly at official functions, and ensuring that the Assembly's meetings proceed smoothly.

• The President also plays a critical role in facilitating discussions and negotiations among member states, ensuring that the voices of all nations are heard.

• The position is held on a rotating basis by representatives of different regional groups to ensure balanced representation.

Q61. Answer: (d) 135º

Given:

tan α = 5/3

tan β = 4

Formula Used:

tan(α + β) = (tan α + tan β) / (1 - tan α × tan β)

Calculation:

tan(α + β) = (5/3 + 4) / (1 - (5/3) × 4)

tan(α + β) = (5/3 + 12/3) / (1 - 20/3)

tan(α + β) = 17/3 / (-17/3)

tan(α + β) = -1

α + β = 135º

The correct answer is option 4

Q62. Answer: (c) 2+√3

Given:

We need to find the value of tan(255°).

Formula used:

tan(255°) can be written as tan(180° + 75°), using the identity:

tan(180° + ×) = tan(×)

Calculation:

tan(255°) = tan(180° + 75°)

=> tan(255°) = tan(75°)

Now,

tan(A + B) = (tanA + tanB) / (1 - tanA × tanB)

Let A = 45° and B = 30°, so:

tan(75°) = tan(45° + 30°) = (tan(45°) + tan(30°)) / (1 - tan(45°) × tan(30°))

=> tan(75°) = (1 + 1/√3) / (1 - 1 × 1/√3)

=> tan(75°) = (1 + 1/√3) / (1 - 1/√3)

=> tan(75°) = (√3 + 1) / (√3 - 1)

=> tan(75°) = [(√3 + 1) × (√3 + 1)] / [(√3 - 1) × (√3 + 1)]

=> tan(75°) = (3 + 2√3 + 1) / (3 - 1)

=> tan(75°) = (4 + 2√3) / 2

=> tan(75°) = 2 + √3

The value of tan(255°) is 2 + √3.

Q63. Answer: (c) Electronic Numerical Integrator and Computer

Source Code:

The correct answer is Electronic Numerical Integrator and Computer.

Key Points

• ENIAC stands for Electronic Numerical Integrator and Computer.

• ENIAC was the first electronic digital programmable computer device developed in the year 1943.

• It was designed and built by John W. Mauchly and J. Presper Eckert at the University of Pennsylvania.

• ENIAC was capable of performing complex calculations much faster than any prior human or mechanical computing methods.

Additional Information

• History of ENIAC

• ENIAC, short for Electronic Numerical Integrator and Computer, was a groundbreaking machine in the history of computing.

• It was developed during World War II and was primarily used for calculating artillery firing tables for the United States Army's Ballistic Research Laboratory.

• ENIAC's development began in 1943 and was completed in 1945. It was unveiled to the public in 1946.

• Technical Specifications of ENIAC

• ENIAC was composed of 17,468 vacuum tubes, 7,200 crystal diodes, 1,500 relays, 70,000 resistors, and 10,000 capacitors.

• The machine consumed about 150 kilowatts of electrical power and could perform around 5,000 additions per second.

• ENIAC was reprogrammable, which meant it could be reconfigured to solve different types of problems, albeit through manual rewiring and setting of switches.

• Impact and Legacy of ENIAC

• ENIAC demonstrated the feasibility and potential of electronic digital computing, paving the way for future advancements in computer science and technology.

• The concepts and technologies developed for ENIAC influenced subsequent computer designs and contributed to the evolution of modern computers.

• ENIAC's success also spurred interest and investment in further research and development of electronic computing systems.

• Key Figures in ENIAC's Development

• John W. Mauchly and J. Presper Eckert were the primary designers and engineers behind ENIAC.

• They collaborated with a team of engineers, including women mathematicians known as "computers," who played an essential role in programming and operating ENIAC.

• After the success of ENIAC, Mauchly and Eckert continued to make significant contributions to the field of computing, including the development of the UNIVAC I, one of the first commercially available computers.

Q64. Answer: (b) 100

Given:

LCM of two numbers = 2400

HCF of two numbers = 20

When the first number is divided by 8, the quotient = 60

Formula Used:

First number = Quotient × Divisor

Product of two numbers = LCM × HCF

Calculation:

First number = 60 × 8

=> First number = 480

Let the second number be x.

Product of two numbers = LCM × HCF

=> 480 × x = 2400 × 20

=> 480x = 48000

=> x = 48000 / 480

=> x = 100

The second number is 100.

Q65. Answer: (b) Mumbai and Pune

The correct answer is Mumbai and Pune.

Key Points

• The Sinhagad Express is the first double-decker train in India, offering a unique travel experience.

• This train operates daily between Mumbai and Pune, connecting two major cities in Maharashtra.

• It is known for its punctuality and efficiency, making it a popular choice for commuters and travelers.

• The double-decker design allows for increased passenger capacity, providing more seating options for travelers.

Additional Information

• Sinhagad Express:

• The Sinhagad Express is a prominent train service in Maharashtra, named after the historic Sinhagad Fort.

• It covers a distance of approximately 192 kilometers between Mumbai and Pune, with a travel time of around 3 to 4 hours.

• The train is equipped with modern amenities to ensure a comfortable journey for passengers.

• The introduction of double-decker coaches was aimed at handling the high passenger demand on this route.

• Double-Decker Trains:

• Double-decker trains are designed with two levels of passenger seating, effectively doubling the capacity compared to single-decker trains.

• These trains are commonly used on routes with high passenger traffic to accommodate more travelers without requiring additional train services.

• Double-decker coaches offer better visibility and more spacious seating arrangements.

• In India, double-decker trains are primarily used on busy intercity routes to enhance the efficiency of the railway network.

• Indian Railways:

• Indian Railways is one of the largest railway networks in the world, operated by the Government of India.

• It plays a crucial role in the transportation sector, connecting various regions of the country.

• Indian Railways offers a wide range of services, including passenger trains, freight trains, and luxury trains.

• The organization continuously upgrades its infrastructure and services to meet the growing demands of travelers and businesses.

Q66. Answer: (c) Z58

The logic followed here is:

Hence, the correct answer is "Z58".

Q67. Answer: (b) 45over7

Given:

The two numbers are 35 and 15. We need to find the third proportional to these two numbers.

Solution:

Step 1: The third proportional to two numbers a and b is given by the formula:

Third proportional = $(b^2) / a$

Step 2: Apply the formula to the given numbers.

Let the third proportional be x. Therefore:

$x = (15^2) / 35$

x = 225 / 35

Step 3: Simplify the fraction.

x = 225 / 35

We can simplify this fraction by dividing both the numerator and the denominator by 5:

x = (225 ÷ 5) / (35 ÷ 5) = 45 / 7

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Conclusion:

The third proportional to 35 and 15 is 45/7.

Q68. Answer: (b) Vitamin C

The correct answer is Vitamin C.

Key Points

• Gooseberry, also known as Amla in India, is widely recognized for its high Vitamin C content.

• Vitamin C is essential for the growth, development, and repair of all body tissues.

• It is involved in many body functions, including the formation of collagen, absorption of iron, the immune system, wound healing, and the maintenance of cartilage, bones, and teeth.

• 100 grams of Amla contains approximately 300 mg of Vitamin C, which is significantly higher than many other fruits.

Additional Information

• Vitamin A:

• It is vital for maintaining healthy vision, skin, and immune function.

• Rich sources of Vitamin A include carrots, sweet potatoes, and dark leafy greens.

• Vitamin D:

• It helps in the absorption of calcium, promoting bone and dental health.

• The body produces Vitamin D when exposed to sunlight, but it can also be found in foods like fatty fish, liver, and fortified dairy products.

• Vitamin B:

• This group of vitamins plays a crucial role in cell metabolism and energy production.

• Sources include whole grains, meat, eggs, and dairy products.

• Vitamin C:

• Ascorbic acid (Vitamin C) is an essential nutrient involved in the repair of tissue and enzymatic production of certain neurotransmitters.

• It is a powerful antioxidant and helps in the protection against immune system deficiencies, cardiovascular disease, prenatal health problems, eye disease, and even skin wrinkling.

• In addition to gooseberries, other sources of Vitamin C include oranges, strawberries, kiwi, bell peppers, broccoli, and Brussels sprouts.

Q69. Answer: (d) 1over3

Given:

The expression to simplify is:

$(p - q)^3 + (q - r)^3 + (r - p)^3 / 9(p - q)(q - r)(r - p)$

Solution:

We use the sum of cubes identity:

$a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$

Let a = (p - q), b = (q - r), and c = (r - p), and simplify the numerator:

(p - q) + (q - r) + (r - p) = 0, so the numerator becomes:

3(p - q)(q - r)(r - p)

Now substitute the simplified numerator back into the expression:

3(p - q)(q - r)(r - p) / 9(p - q)(q - r)(r - p)

Cancel out the common terms and simplify:

3 / 9 = 1 / 3

The value of the expression is 1/3.

Q70. Answer: (a) Sun Temple

The correct answer is Sun Temple.

Key Points

• The Sun Temple, also known as the Konark Sun Temple, is located in Konark, Odisha, India.

• It was built in the 13th century by King Narasimhadeva I of the Eastern Ganga dynasty.

• The temple is designed in the shape of a colossal chariot, having elaborately carved stone wheels, pillars, and walls.

• It is dedicated to the Hindu Sun God, Surya, and is a UNESCO World Heritage Site.

Additional Information

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• Eastern Ganga dynasty:

• The Eastern Ganga dynasty was a medieval Indian dynasty that ruled the region of Kalinga (present-day Odisha and northern Andhra Pradesh) from the 11th century to the early 15th century.

• They are renowned for their patronage of art and architecture, particularly the construction of temples.

• Konark Sun Temple:

• The Konark Sun Temple is one of the most well-known temples in India, famous for its unique architecture and intricate carvings.

• The temple was conceived as a gigantic chariot of the Sun God, with twelve pairs of exquisitely ornamented wheels being pulled by seven horses.

• The temple's architecture and iconography reflect the sophistication of the Ganga dynasty's engineering and artistic capabilities.

• UNESCO World Heritage Site:

• A UNESCO World Heritage Site is a landmark or area with legal protection by an international convention administered by the United Nations Educational, Scientific and Cultural Organization (UNESCO).

• The sites are designated as having cultural, historical, scientific, or other forms of significance, and are deemed important for the collective interests of humanity.

• The Konark Sun Temple was declared a UNESCO World Heritage Site in 1984 for its architectural grandeur and historical significance.

Q71. Answer: (b) North Atlantic Ridge

The correct answer is North Atlantic Ridge.

Key Points

• The Telegraph Plateau is part of the North Atlantic Ridge, also known as the Mid-Atlantic Ridge.

• It is located in the North Atlantic Ocean, extending from the Arctic Ocean to the Southern Atlantic Ocean.

• The North Atlantic Ridge is a divergent or constructive plate boundary between the Eurasian Plate and the North American Plate.

• The ridge is characterized by a central rift valley, where tectonic plates are pulling apart, allowing magma to rise from below the Earth's crust.

Additional Information

• Mid-Atlantic Ridge

• The Mid-Atlantic Ridge is an underwater mountain range that runs down the center of the Atlantic Ocean, from the Arctic Ocean in the north to the Southern Ocean in the south.

• It is a divergent or constructive boundary between tectonic plates, where new oceanic crust is formed by volcanic activity.

• The ridge is the longest mountain range in the world, stretching over 16,000 kilometers (10,000 miles).

• It plays a crucial role in the theory of plate tectonics and sea-floor spreading.

• Telegraph Plateau

• The Telegraph Plateau is an oceanic plateau located in the North Atlantic Ocean.

• It is named after the early transatlantic telegraph cables that were laid across it in the 19th century.

• The plateau lies west of the Mid-Atlantic Ridge and is part of the broader North Atlantic Ridge system.

• It has a relatively flat topography compared to the surrounding abyssal plains and ridge structures.

• Plate Tectonics

• Plate tectonics is the scientific theory explaining the movement of the Earth's lithosphere, which is divided into tectonic plates.

• These plates move over the semi-fluid asthenosphere, leading to the formation of various geological features and phenomena such as earthquakes, volcanic activity, and mountain building.

• Divergent boundaries, such as the Mid-Atlantic Ridge, are where plates move apart, allowing magma to rise and create new crust.

• Other types of plate boundaries include convergent boundaries (where plates collide) and transform boundaries (where plates slide past each other).

Q72. Answer: (d) Copper

The correct answer is Copper.

Key Points

• Copper was the first metal to be used by humans, marking the end of the Stone Age and the beginning of the Copper Age.

• It was used in the creation of tools and weapons, which were more durable than those made of stone.

• The use of copper dates back to around 10,000 years ago, with evidence of copper smelting found in archaeological sites.

• Copper is easily extracted and worked with, making it an ideal first metal for early human societies.

Additional Information

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• Magnesium
• Magnesium is a light, silvery-white, and relatively tough metal.
• It is not found as a free element in nature but occurs in combination with other elements like carbonates, sulfates, and silicates.
• Magnesium was isolated by Sir Humphry Davy in 1808.
• Silver
• Silver is a precious metal with high economic value.
• It is known for its high conductivity and luster.
• Silver has been used in jewelry, coins, and various industrial applications.
• It has been used by humans for thousands of years, but not as early as copper.
• Gold
• Gold is a highly valued precious metal known for its rarity and beauty.
• It has been used by humans for over 6,000 years.
• Gold is often associated with wealth and has been used in jewelry, currency, and as a standard for monetary systems.
• Copper
• Copper is a reddish-brown metal with high thermal and electrical conductivity.
• It was one of the first metals to be used by humans, primarily for tools and ornaments.
• Copper can be found as native copper or in minerals such as chalcopyrite and malachite.
• It played a crucial role in the development of early human civilizations.

Q73. Answer: (c) 6

Given:
Data: 2, 5, 6, 8, 9
Formula Used:
Variance = $\Sigma(x_i - \mu)^2 / N$
Where:
Σ represents the sum
x_i represents each data point
μ represents the mean of the data
N represents the number of data points
Calculation:
Calculate the mean (μ) of the data.
$\mu = (2 + 5 + 6 + 8 + 9) / 5$
$\mu = 30 / 5$
$\mu = 6$
Calculate each deviation from the mean, square it, and then find the average of these squares.
$(2 - 6)^2 = (-4)^2 = 16$
$(5 - 6)^2 = (-1)^2 = 1$
$(6 - 6)^2 = (0)^2 = 0$
$(8 - 6)^2 = (2)^2 = 4$
$(9 - 6)^2 = (3)^2 = 9$
Step 3: Sum these squared deviations.
16 + 1 + 0 + 4 + 9 = 30
Step 4: Divide by the number of data points (N = 5).
Variance = 30 / 5
Variance = 6
The variance for the given data is 6.

Q74. Answer: (d) IUCN

The correct answer is IUCN.
Key Points
• IUCN (International Union for Conservation of Nature) is a membership Union uniquely composed of both government and civil society organizations.

• Created in 1948, IUCN has evolved into the world's largest and most diverse environmental network.

• IUCN is known for its Red List of Threatened Species, which is a critical indicator of the health of the world's biodiversity.

• The IUCN Red List provides information about range, population size, habitat and ecology, use and/or trade, threats, and conservation actions that will help inform necessary conservation decisions.

Additional Information

• UNEP (United Nations Environment Programme)

• UNEP is the leading global environmental authority that sets the global environmental agenda.

• It promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system.

• It was established after the United Nations Conference on the Human Environment in June 1972.

• Its mission is to encourage sustainable development through sound environmental practices globally.

• WNO (World Meteorological Organization)

• WNO, established in 1950, is a specialized agency of the United Nations.

• It is dedicated to international cooperation and coordination on the state and behavior of the Earth's atmosphere, its interaction with the oceans, the climate it produces, and the resulting distribution of water resources.

• WMO has a membership of 191 Member States and Territories as of 2021.

• It provides world leadership and expertise in international cooperation in the delivery and use of high-quality, authoritative weather, climate, hydrological, and related environmental services by its Members.

• WWF (World Wide Fund for Nature)

• WWF is an international non-governmental organization founded in 1961, working in the field of wilderness preservation, and the reduction of human impact on the environment.

• It is the world's largest conservation organization with over five million supporters worldwide, working in more than 100 countries.

• WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

• WWF's work focuses on conserving the world's most important forests, oceans, and freshwater ecosystems, and on addressing global threats such as climate change and unsustainable resource use.

Q75. Answer: (c) 20

Given:

A = 55

Z = 11

H = 5

D = 5

Formula Used:

Value = A ÷ Z × H - D

Calculation:

=> Value = 55 ÷ 11 × 5 - 5

=> Value = 5 × 5 - 5

=> Value = 25 - 5

=> Value = 20

The value is 20.

Q76. Answer: (b) 73 : 27

Given:

Radius of the circular sheet = 20 cm

Radius of each cut circle = 6 cm

Number of cut circles = 3

Formula Used:

Area of a circle = πr^2

Ratio = Area of uncut portion / Area of cut portion

Calculation:

Area of the original circular sheet:

Area_(original) = $\pi \times 20^2$

Area_(original) = π × 400
Area_(original) = 400π cm²
Area of one cut circle:
Area_(cut) = π × 6²
Area_(cut) = π × 36
Area_(cut) = 36π cm²
Total area of cut circles:
Total Area_(cut) = 3 × 36π
Total Area_(cut) = 108π cm²
Area of the uncut portion:
Area_(uncut) = Area_(original) - Total Area_(cut)
Area_(uncut) = 400π - 108π
Area_(uncut) = 292π cm²
Ratio of the area of uncut to the area of the cut portion:
Ratio = Area_(uncut) / Total Area_(cut)
Ratio = 292π / 108π
Ratio = 292 / 108
Ratio = 73 / 27
The ratio of the area of uncut to the area of the cut portion is 73 : 27.

Q77. Answer: (b) the sun, the moon and the earth from a right-angled triangle

The correct answer is the sun, the moon and the earth from a right-angled triangle.
Key Points
• Neap tides occur when the gravitational forces of the moon and the sun are perpendicular to each other in relation to the Earth.
• This configuration happens when the moon is in its first or last quarter phases.
• During neap tides, the difference between high and low tides is minimal.
• Neap tides occur twice a month, coinciding with the quarter moon phases.
Additional Information
• Tides
• Tides are the rise and fall of sea levels caused by the combined effects of the gravitational forces exerted by the Moon, the Sun, and the rotation of the Earth.
• There are two main types of tides: spring tides and neap tides.
• Spring Tides
• Spring tides occur when the Earth, the sun, and the moon are in a straight line (during new moon and full moon).
• These tides have the highest high tides and the lowest low tides due to the combined gravitational pull of the sun and the moon.
• Neap Tides
• Neap tides occur when the gravitational forces of the moon and the sun are perpendicular to each other.
• During neap tides, the difference between high and low tides is the least.
• They occur during the first and last quarter phases of the moon.
• Gravitational Forces
• The gravitational force is a force that attracts any two objects with mass.
• In the context of tides, the gravitational pull of the moon has the most significant effect due to its proximity to the Earth.
• The sun also affects tides, but to a lesser extent compared to the moon due to its greater distance from the Earth.

Q78. Answer: (b) 1st December 1963

The correct answer is 1st December 1963.
Key Points
• Nagaland was officially declared the 16th state of India on 1st December 1963.
• It was formed after the enactment of the State of Nagaland Act, 1962.
• Nagaland consists of 11 districts with Kohima being its capital.
• The state was created to recognize the unique culture and identity of the Naga people.
Additional Information

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• State of Nagaland Act, 1962:

• This Act was passed by the Indian Parliament to provide for the formation of the state of Nagaland.

• It outlined the territorial extent, the composition of the legislative assembly, and other administrative details.

• Formation of States in India:

• India has undergone several reorganizations of states since its independence in 1947.

• The States Reorganisation Act of 1956 was a major reform that reorganized the boundaries of India's states based on linguistic lines.

• New states have since been created to address various demands for autonomy and recognition of cultural identities.

• Naga People:

• The Nagas are an indigenous ethnic group native to the northeastern part of India and northwestern Myanmar.

• They have a rich cultural heritage, including traditional dances, music, and festivals such as the Hornbill Festival.

• The demand for a separate state by the Naga people was driven by their desire to preserve their distinct cultural identity.

• Significance of Nagaland's Statehood:

• The creation of Nagaland as a state helped to address the political and cultural aspirations of the Naga people.

• It provided a framework for self-governance and development within the Indian Union.

• Nagaland's statehood has contributed to the preservation and promotion of Naga culture and traditions.

Q79. Answer: (b) First Schedule

The correct answer is First Schedule.

Key Points

• The First Schedule of the Indian Constitution lists all the states and union territories along with their territories.

• Any changes in the boundaries, names, or formation of new states or union territories require an amendment to the First Schedule.

• The formation of a new state involves the reorganization of existing states or union territories, which must be reflected in the First Schedule.

• Amending the First Schedule requires a constitutional amendment, which must be passed by both houses of Parliament.

Additional Information

• Fourth Schedule:

• The Fourth Schedule of the Indian Constitution deals with the allocation of seats in the Rajya Sabha (Council of States).

• It specifies the number of seats allocated to each state and union territory.

• Changes to this schedule do not relate to the formation of new states but to the representation in the Rajya Sabha.

• Third Schedule:

• The Third Schedule lists the forms of oaths or affirmations for various constitutional posts, including the President, judges, and members of Parliament and state legislatures.

• This schedule is not related to the formation of new states.

• Second Schedule:

• The Second Schedule of the Constitution deals with the emoluments, allowances, and privileges of various constitutional office holders like the President, Governors, Judges, etc.

• It does not pertain to the formation of new states.

Q80. Answer: (c) 8

Given:

$a^4 + b^4 = 17$

$a + b = 1$

We need to find the value of $a^2b^2 - 2ab$.

Formula used:

We will use the identity for the sum of squares:

$(a + b)^2 = a^2 + 2ab + b^2$

We are also given $a^4 + b^4 = 17$, which we can relate to $(a^2 + b^2)^2$ using the identity:

$(a^2 + b^2)^2 = a^4 + 2a^2b^2 + b^4$

Calculations:

From $(a + b)^2 = a^2 + 2ab + b^2$, we can find $a^2 + b^2$:

$(a + b)^2 = 1^2 = 1$

$a^2 + 2ab + b^2 = 1$

So, $a^2 + b^2 = 1 - 2ab$

Now, using the identity $(a^2 + b^2)^2 = a^4 + 2a^2b^2 + b^4$, substitute $a^4 + b^4 = 17$:

$(a^2 + b^2)^2 = 17 + 2a^2b^2$

We know that $a^2 + b^2 = 1 - 2ab$, so we square both sides:

$(1 - 2ab)^2 = 17 + 2a^2b^2$

Expanding $(1 - 2ab)^2$:

$1 - 4ab + 4a^2b^2 = 17 + 2a^2b^2$

Now, simplify this equation:

$1 - 4ab + 4a^2b^2 = 17 + 2a^2b^2$

Rearranging terms:

$1 - 17 - 4ab = 2a^2b^2 - 4a^2b^2$

$-16 - 4ab = -2a^2b^2$

Dividing both sides by -2:

$8 + 2ab = a^2b^2$

Now, the expression we need to find is $a^2b^2 - 2ab$. Using the result above, we get:

$a^2b^2 - 2ab = 8$

Therefore The value of $a^2b^2 - 2ab$ is 8.

Q81. Answer: (d) 40

Given:

A, B, and C complete a task in 8 days.

A alone or B alone can complete the task in 20 days.

Formula Used:

Work rate = 1 / Time taken

Combined work rate = Work rate of A + Work rate of B + Work rate of C

Calculation:

Work rate of A + B + C = 1 / 8

Work rate of A = 1 / 20

Work rate of B = 1 / 20

Work rate of A + B = (1 / 20) + (1 / 20)

Work rate of A + B = 2 / 20 = 1 / 10

Combined work rate of A, B, and C:

Work rate of A + B + C = 1 / 8

Work rate of A + B + C = (1 / 10) + Work rate of C

=> 1 / 8 = 1 / 10 + Work rate of C

=> Work rate of C = 1 / 8 - 1 / 10

=> Work rate of C = (10 - 8) / 80

=> Work rate of C = 2 / 80

=> Work rate of C = 1 / 40

Time taken by C to complete the task alone = 1 / Work rate of C

Time taken by C = 40 days

The correct answer is option 4.

Q82. Answer: (a) 154 cm2

Given:

The difference between the circumference and the radius of a circle is 37 cm.

Formula Used:

1. Circumference of a circle = $2\pi r$

2. Area of a circle = πr^2

Calculation:

Let the radius of the circle be r cm.

According to the given condition:

$2\pi r - r = 37$

$\Rightarrow r(2\pi - 1) = 37$

$\Rightarrow r = 37 / (2\pi - 1)$

Using $\pi \approx 22/7$:

$\Rightarrow r = 37 / (2 \times 22/7 - 1)$

$\Rightarrow r = 37 / (44/7 - 1)$

$\Rightarrow r = 37 / (44/7 - 7/7)$

$\Rightarrow r = 37 / (37/7)$

$\Rightarrow r = 37 \times 7 / 37$

$\Rightarrow r = 7$ cm

Now, Area of the circle = πr^2

$\Rightarrow$ Area = $22/7 \times 7^2$

$\Rightarrow$ Area = $22/7 \times 49$

$\Rightarrow$ Area = 154 cm^2

The area of the circle is 154 cm^2.

Q83. Answer: (c) 12

The correct answer is 12.

Key Points

• NH-44 is the longest National Highway in India, stretching from Srinagar in Jammu & Kashmir to Kanyakumari in Tamil Nadu.

• It passes through 12 states and Union Territories, which include Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Uttar Pradesh, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu.

• The total length of NH-44 is approximately 3,745 kilometers.

• This highway plays a crucial role in connecting the northern and southern parts of India, facilitating trade and travel across the country.

Additional Information

• National Highway (NH)

• National Highways are the primary roadways that connect various states and major cities across India.

• They are maintained by the National Highways Authority of India (NHAI) and the Ministry of Road Transport and Highways.

• National Highways constitute about 2% of India's total road network but carry about 40% of the road traffic.

• They are essential for the economic development and connectivity of the country, reducing travel time and fuel consumption.

• National Highway 44 (NH-44)

• NH-44 was previously known as NH-7 before the renumbering of national highways in 2010.

• It is the longest National Highway in India, spanning from north to south.

• NH-44 covers a diverse range of geographical terrains and climates, from the cold mountains of Jammu & Kashmir to the tropical coasts of Tamil Nadu.

• It is a critical route for the transportation of goods and passengers, promoting regional and national integration.

• Importance of NH-44

• NH-44 plays a significant role in the economic development of the regions it passes through by improving connectivity and reducing transportation costs.

• It enhances access to markets, education, and healthcare services for the people living in remote areas.

• It supports tourism by providing better access to tourist destinations along its route.

• The highway also boosts industrial growth by facilitating the movement of raw materials and finished goods.

Q84. Answer: (a) Cold

The logic followed here is:

Cold	Temperature
Glacier	Frozen water
Ice	Frozen water
Snow	Frozen water

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Glacier, Ice, Snow all are Synonyms of Frozen water,
Whereas,
Cold is related to temperature.
Hence, the correct answer is "Cold".

Q85. Answer: (c) 144

Given:
A man and a boy, together, can complete a task in 60 days.
Their efficiency is in the ratio of 7:5.
Formula Used:
Efficiency ratio: Efficiency of man / Efficiency of boy = 7 / 5
Total work = Efficiency × Time
Calculation:
Let the efficiency of the man be 7x and the efficiency of the boy be 5x.
Total efficiency of both = 7x + 5x = 12x
Total work done in 60 days = 12x × 60
Total work = 720x
Work done by the boy alone:
Total work = Efficiency of boy × Time taken by boy
720x = 5x × Time taken by boy
=> Time taken by boy = 720x / 5x
=> Time taken by boy = 144 days
The boy alone will take 144 days to complete the task.

Q86. Answer: (c) Tomato

Given: Words: Potato, Turmeric, Tomato, Ginger
1) Potato: A tuber, grows underground.
2) Turmeric: A rhizome, grows underground.
3) Tomato: A fruit, grows above ground.
4) Ginger: A rhizome, grows underground.
Potato, turmeric, and ginger are all plants that grow underground
Thus, the odd one out is Tomato.
Hence, the answer is "Option 3".

Q87. Answer: (d) MN, 37

The logic followed here is:
Option 1) RQ, 35
Option 2) TS, 39
Option 3) HI, 17
Option 4) MN, 37
Hence, the correct answer is "MN, 37".

Q88. Answer: (c) 19

The logic follows here:
1st number ÷ 7 = 2nd number
Given:
119 : 17
=> 119 ÷ 7 = 17
Similarly,
133 : ?
=> 133 ÷ 7 = 19
Hence, the correct answer is "Option (3)".

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Q89. Answer: (d) Saturday

According to the given information:

1) P takes the class on Friday and S takes the class on Wednesday.

Weekdays	Teachers
Monday	
Tuesday	
Wednesday	S
Thursday	
Friday	P
Saturday	

2) T takes the class next day after S.

Weekdays	Teachers
Monday	
Tuesday	
Wednesday	S
Thursday	T
Friday	P
Saturday	

3) R takes the class on the very next day to that of Q.

Weekdays	Teachers
Monday	Q
Tuesday	R
Wednesday	S
Thursday	T
Friday	P
Saturday	

So, only U is remaining.

Weekdays	Teachers
Monday	Q
Tuesday	R
Wednesday	S
Thursday	T
Friday	P
Saturday	U

Thus, U takes the class on Saturday.

Hence, the correct answer is "Saturday".

Q90. Answer: (c) Uttar Pradesh

The logic followed here is:

Logic: Location of National Parks.

Here,

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Bandipur National Park : Karnataka → Bandipur National Park is located in Karnataka.
Similarly,
Dudhwa National Park : Uttar Pradesh → Dudhwa National Park is located in Uttar Pradesh.
Hence, the correct answer is "Option 3".

Q91. Answer: (c) FT

The logic followed here is: 1st letter and 2nd letters are opposite to each other.
Thus, FT is odd one.
Hence, the correct answer is "FT".

Q92. Answer: (a) 59

The logic followed here is:
'VKMD' is written as '55',
'RQEF' is written as '51'
Similarly, the code for 'WZBC':
Hence, the correct answer is "59".

Q93. Answer: (d) Car

The logic followed here is:

Word	is Called
airplane	motorbike
helicopter	airplane
boat	car
motorbike	boat
car	helicopter

So, the 'Boat' floats on water.
But, 'boat' is called 'car'.
Hence, the correct answer is "Option (4)".

Q94. Answer: (a) Father

Family Chart:
Given: Pointing towards a picture, a man said, “She is my wife’s father-in-law's only son’s daughter”.
So, the man is the "Father" of the girl in the picture.
Hence, the correct answer is "Father".

Q95. Answer: (c) Buneeta

According to the given information:
1) Aneeta, Suneeta and Vineeta are smart.

Persons	Smart	Dull	Sporty	Tall
Aneeta	Yes			
Suneeta	Yes			
Vineeta	Yes			
Muneeta	X			
Buneeta	X			

2) Muneeta, Buneeta and Suneeta are dull.

Persons	Smart	Dull	Sporty	Tall
Aneeta	Yes	X		
Suneeta	Yes	Yes		

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Vineeta	Yes	X		
Muneeta	X	Yes		
Buneeta	X	Yes		

3) Vineeta, Buneeta and Aneeta are sporty.

Persons	Smart	Dull	Sporty	Tall
Aneeta	Yes	X	Yes	
Suneeta	Yes	Yes	X	
Vineeta	Yes	X	Yes	
Muneeta	X	Yes	X	
Buneeta	X	Yes	Yes	

4) Suneeta, Muneeta and Aneeta are tall.

Persons	Smart	Dull	Sporty	Tall
Aneeta	Yes	X	Yes	Yes
Suneeta	Yes	Yes	X	Yes
Vineeta	Yes	X	Yes	X
Muneeta	X	Yes	X	Yes
Buneeta	X	Yes	Yes	X

Thus, Buneeta is neither smart nor tall.

Hence, the correct answer is "Buneeta".

Q96. Answer: (a) 32

The logic followed here is:

Thus, 32 does not belong to the series.

Hence, the correct answer is "32".

Q97. Answer: (d) Ayurveda

The logic followed here is:

Logic: Award Categories.

Here,

Dronacharya Award : Sports Coaching → Dronacharya Award is given for excellence in Sports Coaching.

Similarly,

Dhanwantri Award : Ayurveda → Dhanwantri Award is given for excellence in Ayurveda.

Hence, the correct answer is "Option 4".

Q98. Answer: (c) RX

The logic followed here is:

EJ : JT

Similarly, IL : ?

Hence, the correct answer is "RX".

Q99. Answer: (c) Only conclusion II follows.

Given,

Statement: Of all the ice creams brands manufactured in India, ‘Amulya’ brand has the highest sales since last five years. The sales of other ice cream brands fluctuate every year.

Conclusions:

I. The taste of ‘Amulya’ ice creams is popular among Indian residents.

• The statement mentions that Amulya has the highest sales for the past five years.

• High sales could be due to multiple factors such as marketing or distribution.
• Conclusion I is an assumption regarding taste that is not directly supported by the statement.
• Therefore, this conclusion does not logically follow.

II. The sales of all other Indian brands of ice creams are known.
• The statement mentions that the sales of other ice cream brands fluctuate every year.
• This indicates that there is data available regarding the sales of the other brands, for it to be known that they fluctuate.
• Therefore, it can be inferred that the sales of all other Indian brands of ice creams are known.

So, Only conclusion II follows..

Hence, the correct answer is "Option 3".

Q100. Answer: (b) Only assumptions I and II are implicit.

Given Statement: Sally wanted to invite Harry over for a good dinner, so she made broccoli soup and apple pie for him.

Now,

Assumptions:

1. Harry will accept the dinner invitation - Implicit (Sally prepared the dinner with the assumption that Harry would accept the invitation)

2. Harry likes broccoli soup and apple pie - Implicit (Sally made these dishes likely because she assumed Harry likes them)

3. Harry doesn’t like apple pie too much - Not Implicit (There is no clear indication in the statement that Sally believes Harry doesn't like apple pie too much)

Here, only assumptions I and II are implicit.

Hence, the correct answer is "Option 2".

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