RRB NTPC CBT-I Official Paper (Held On: 23 July 2021 Shift 2) (Previous Year Paper)

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

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Q1. A person starting from his house covers a distance at 15 km/hr and returns to the starting place at a speed of 10 km/hr. then find his average speed.

(a) 11 km/hr
(b) 12 km/hr
(c) 13 km/hr
(d) 121/2 km/hr

Q2. Which of the following Central Public Sector Enterprises does NOT have the 'Maharatna' status (as on January 2021)?

(a) Steel Authority of India Limited
(b) GAIL (India) Limited
(c) Coal India Limited
(d) Oil India Limited

Q3. Which of the following rivers is a part of National Waterway 5 (NW-5)?

(a) Godavari
(b) Damodar
(c) Krishna
(d) Brahmani

Q4. Which of the following books is NOT written by Dr. APJ Abdul Kalam?

(a) The Discovery of India
(b) India 2020: A Vision for the New Millennium
(c) Ignited Minds: Unleashing the Power Within India
(d) Wings of Fire: An Autobiography

Q5. A man completes 30 km of a journey at 6 km/hr and the remaining 40 km of the journey in 5 hr. His average speed for the whole journey is:

(a) 7 km/hr
(b) 64/11 km/hr
(c) 8 km/hr
(d) 5 km/hr

Q6. If tan θ = frac p q, then (p sin θ - q cos θ)/(p sin θ + q cos θ) = _____

(a) $2pq/(P^2 + q^2)$
(b) $(P^2 - q^2)/(P^2 + q^2)$
(c) $2p/(P^2 + q^2)$
(d) $(q^2 - p^2)/(P^2 + q^2)$

Q7. Under which Act were plantation labourers NOT allowed to leave tea gardens without permission?

(a) Transfer of Property Act, 1882
(b) Indian Contract Act, 1872
(c) Inland Emigration Act, 1859
(d) Indian Slavery Act, 1843

Q8. The Hindustan Socialist Republican Army was established in 1928 at the _____ in Delhi.

(a) Nirankari ground
(b) India Gate
(c) Red Fort
(d) Feroz Shah Kotla ground

Q9. HDFC lends Rs. 1 million to HUDCO at 10% p.a. simple interest for three years and HUDCO lends the same amount to Sahara States Housing Corporation at 10% p.a. of compound interest for three years. What is the earning of HUDCO in this way?

(a) Rs. 32,100
(b) Rs. 1,33,100
(c) Rs. 33,100
(d) Rs. 31,000

Q10. In which year did the Government of India pass the Water (Prevention and Control Pollution) Act to safeguard our water resources?

(a) 1973
(b) 1976
(c) 1974
(d) 1975

Q11. Which of the following is the Extension of Microsoft Word files?

(a) docd
(b) dcox
(c) mwd
(d) docx

Q12. Select the option that is related to the fourth term in the same way as the first term is related to the second term.

Balance : Weight :: ? : Length

(a) Gram
(b) Measuring Tape
(c) Horizontal Distance
(d) Centimetre

Q13. The ratio of sand and cement in a mix was initially 9 : 2. After adding another 20 kg of sand and 10 kg of cement to the mix, the ratio of sand and cement became 4 : 1. What was the initial quantity of cement in the mix?

(a) 30 kg
(b) 50 kg
(c) 20 kg
(d) 40 kg

Q14. Crocodiles have a _____ heart.

(a) six-chambered
(b) four-chambered
(c) one-chambered
(d) two-chambered

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Q15. Pointing at a picture of a boy, Shreyas said, "He is the son of the only brother of my father's daughter." How is Shreyas related to the boy?

(a) Father
(b) Paternal uncle
(c) Maternal uncle
(d) Brother

Q16. If '+' means multiplication, '÷' means addition, '-' means division and '×' means subtraction, then what is the value of the following expression?

17 + 7 ÷ 27 - 3 × 13

(a) 21.7
(b) 31.7
(c) 115
(d) 117

Q17. If the volume of a cube is equal to the volume of a cuboid of dimensions 54 cm, 18 cm and 6 cm, then the length of the side of the cube is:

(a) 16 cm
(b) 12 cm
(c) 18 cm
(d) 24 cm

Q18. Which two fractions can be inserted between 5over7 and 3over4 ?

(a) 1/2, 2/5
(b) 2/3, 5/6
(c) 8/11, 11/15
(d) 7/9, 8/9

Q19. The 100^(th) Amendment (2015) to the constitution of India is related to:

(a) a maximum of 10% reservation for the economically weaker sections
(b) establishment of the National Judicial Appointment Commission
(c) ratification of the land boundary agreement between India and Bangladesh
(d) introduction of the Goods and Services Tax

Q20. The 'Pen Drive' was invented by IBM in the year _____.

(a) 2003
(b) 1998
(c) 1990
(d) 1988

Q21. In which of the following elections are one-third of the seats reserved for women?

(a) Panchayati Raj
(b) Lok Sabha
(c) Legislative assembly
(d) Rajya Sabha

Q22. Raja started a vegetable business with a capital of Rs. 4400. After few months, Ranga joined him with a capital of Rs. 2400. Out of the total annual profit of Rs. 1200, Raja's share is Rs. 800. When did Ranga join as a partner?

(a) 1 month after Raja started the business
(b) 2 months after Raja started the business
(c) 2 months before the end of the year
(d) 1 month before the end of the year

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Q23. 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:

Some fridges are machines.

Some mixers are machines.

No mixer is a fridge.

All fans are mixers.

Conclusions:

I. Some fans are fridges.

II. Some machines are not mixers.

Ill. No fan is a fridge.

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

Q24. The Pradhan Mantri Awas Yojana - Urban (PMAY-U) was launched in the year _____ by the Government of India.

(a) 2012
(b) 2019
(c) 2015
(d) 2018

Q25. A and B can do a piece of work in 6 days and A alone can do it in 9 days. The time taken by B alone to do the same work is _____ days.

(a) 12
(b) 18
(c) 20
(d) 16

Q26. A and B started a business with capital investments of Rs. 7500 and Rs. 8000. If they withdraw from the business after 8 months and 10 months, respectively, the ratio in which they divide the profit is:

(a) 3 : 4
(b) 3 : 7
(c) 3 : 5
(d) 3 : 8

Q27. According to the Union Budget 2021-2022, what is the budget size of India?

(a) 10.52 lakh crore
(b) 34.83 lakh crore
(c) 44.56 lakh crore
(d) 16.95 lakh crore

Q28. Bangladesh celebrates its Independence Day on:

(a) 26 February
(b) 12 March
(c) 20 April
(d) 26 March

Q29. The greatest number among - 3over2, 3over2, 11over4, 5over2 is:

(a) 5over2
(b) • 3/2
(c) 3over2
(d) 11over4

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Q30. The Rajasthan Atomic Power Station was constructed with the assistance of _____.

(a) Australia
(b) Canada
(c) Germany
(d) Japan

Q31. In which country is the Wimbledon Tennis Tournament held?

(a) Australia
(b) France
(c) England
(d) United States of America

Q32. 'COVAXIN' is India's indigenous COVID-19 vaccine developed by:

(a) ICMR and Indian Medicines Pharmaceutical Corporation Limited
(b) Bharat Biotech and ICMR-National Institute of Virology
(c) Indian Medicines Pharmaceutical Corporation Limited and Rajasthan Drugs and Pharmaceuticals Limited
(d) Bharat Biotech and National Pharmaceutical Pricing Authority

Q33. Which of the following are co-primes?

(a) 21, 56
(b) 12, 27
(c) 28, 81
(d) 36, 20

Q34. Who was the Governor General of India between 1848 and 1856?

(a) Lord William Bentinck
(b) Lord Minto
(c) Lord Dalhousie
(d) Lord Warren Hastings

Q35. If the side of a right-angled isosceles triangle is 2 m, then its hypotenuse is _____.

(a) 2 √8 m
(b) 8 √2 m
(c) 2 √4 m
(d) 2 √2 m

Q36. The smallest three-digit prime number is:

(a) 103
(b) 107
(c) 109
(d) 101

Q37. The Secretariat of the South Asian Association for Regional Cooperation (SAARC) was set up at _____ in 1987.

(a) New Delhi
(b) Dhaka
(c) Islamabad
(d) Kathmandu

Q38. Select the INCORRECT pair of bone and related part of the human body from the given options.

(a) Carpal bone - Neck
(b) Ulna bone - Hand
(c) Maxilla - Jaw
(d) Patella bone - Foot

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Q39. Who was awarded the Best Actor (Female) award at the 67^(th) National Film Awards 2020, announced in March 2021?

(a) Kangana Ranaut
(b) Alia Bhatt
(c) Deepika Padukone
(d) Taapsee Pannu

Q40. Select the combination of letters that when sequentially placed in the blanks of the given series will create a repetitive pattern.

QR_Q_R_Q_RRQ

(a) QRQR
(b) RQQR
(c) QQRQ
(d) RQRQ

Q41. What is the correct sequence from North to South of the following ranges of the Himalayas?

1. Ladakh, 2. Zaskar, 3. Karakoram, 4. Pir Panjal

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

Q42. If 92 × 32 = 10, 73 × 41 = 7 and 26 × 78 = 9, then what will be the value of 33 × 28?

(a) 30
(b) 4
(c) 12
(d) 60

Q43. (-3) × (-7) = (-7) × (-3) is _____ property.

(a) distributive
(b) closure
(c) associative
(d) commutative

Q44. K is shorter than N but taller than M. J is taller than K but shorter than N. Who is the shortest among K, N, M and J?

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

Q45. If B is the mother of C, D is the sister of C, C is the daughter of A, and E is the son of D, then how is A related to E?

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

Q46. What is the value of

$\sin^2 5^o + \sin^2 10^o + \sin^2 80^o + \sin^2 85^o$?

(a) 0
(b) 1
(c) 3
(d) 2

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Q47. Which of the following facts about the 'Dandi March' is NOT true?

(a) This march lasted for 24 days.
(b) It was led by Mahatma Gandhi.
(c) The volunteers used to travel 25 miles per day.
(d) It started with 78 volunteers.

Q48. How would you express 48% as a fraction?

(a) 12over25
(b) 10over25
(c) 11over25
(d) 1over25

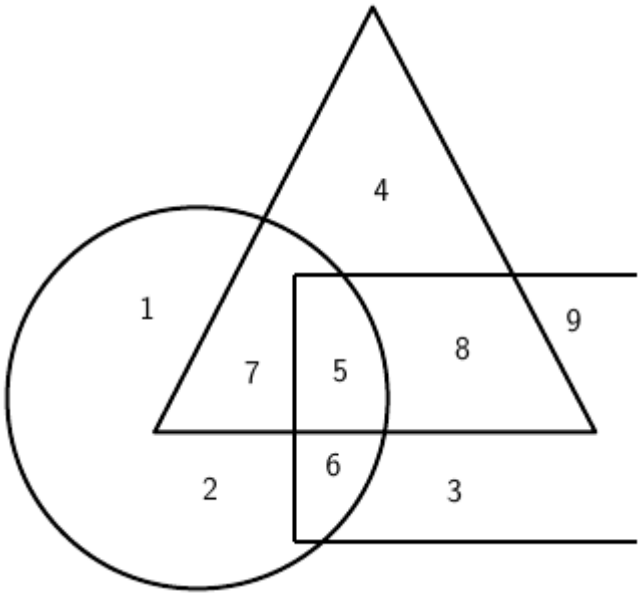
Q49. When 43 is divided by x, the remainder is x - 5. If x is a natural number, how many solutions will x have?

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

Q50. Find the length of the tangent from the point (2, 3) to the circle $x^2+y^2=4$.

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

Q51. In the given diagram, the triangle represents female graduates, the rectangle represents self-employed females and the circle represents self-employed persons with bank loan facilities. Based on the numbers shown in the different sections of the diagram, answer the following question.



How many female graduates are self-employed?

(a) 15
(b) 12
(c) 20
(d) 13

Q52. The anemometer is a device used for measuring:

(a) cloud height
(b) air pressure
(c) wind speed
(d) water quality

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Q53. Which of the following is an example of a volcanic mountain?

(a) Appalachians
(b) Ural
(c) Himalayas
(d) Fujiyama

Q54. Which of the following greenhouse gases is NOT included under the Kyoto Protocol?

(a) Nitrous oxide
(b) Carbon dioxide
(c) Methane
(d) Ozone

Q55. Select the INCORRECT pair of railway zone and its headquarters.

(a) South Central - Secunderabad
(b) West Central - Jabalpur
(c) East Central - Hajipur
(d) North Central - Gorakhpur

Q56. A place where animals are protected in their natural habitat is called a:

(a) wildlife sanctuary
(b) biosphere reserve
(c) zoo
(d) national park

Q57. If the HCF of two numbers is 18 and their LCM is 378, then which of the following is a possible pair of such numbers?

(a) 54, 252
(b) 18, 252
(c) 54, 126
(d) 27, 252

Q58. Match the following gases and their formulas.

Gas	Formula
A. Methane	1. CH4
B. Ethane	2. C3H8
C. Propane	3. C4H10
D. Butane	4. C2H6

(a) A -1, B-2, C-4, D-3
(b) A-3, B-4, C-2, D-1
(c) A-1, B-4, C-2, D-3
(d) A-4, B-1, C-3, D-2

Q59. In a certain code language, MORE is written as NRWL. How will FOUR be written as in that language?

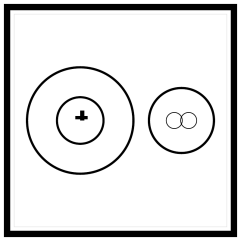
(a) GRZY
(b) GPYZ
(c) GRYZ
(d) GZRY

Q60. Select the Venn diagram that best represents the relationship between the following classes.

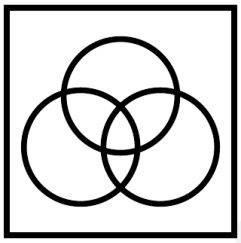
Parasites, Lice, Deer

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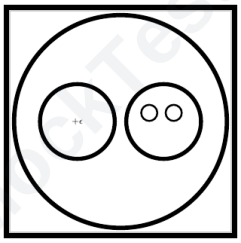
(a)



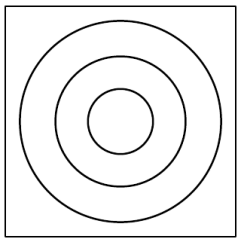
(b)



(c)



(d)



Q61. Solve the following:

79 + [37 - {45 - (1 - 36 ÷ 6 × 8)}] = ?

(a) 41
(b) 59
(c) 24
(d) 33

Q62. The cost price of 12 oranges is equal to the selling price of 9 oranges and the discount on 10 oranges is equal to the profit on 5 oranges. What is the percentage of discount (correct up to 2 decimal places)?

(a) 11.11
(b) 33.33
(c) 16.67
(d) 44.44

Q63. The traditional weave of Gujarat is known as _____.

(a) Patola
(b) Tussar
(c) Kanjeevaram
(d) Jamdani

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Q64. In a parallelogram PQRS, p = (-1, -1), Q = (8, 0) and R = (7, 5). What are the coordinates of 'S'?

(a) (-2, 7/2)
(b) (- 3/2, 4)
(c) (-1, 4)
(d) (-2, 4)

Q65. Select the INCORRECT pair of state and its chief Minister (as of March 2021) from the following.

(a) Mr. Bhupesh Baghel - Jharkhand
(b) Mr. Manohar Lal Khattar - Haryana
(c) Mr. Pinarayi Vijiayan - Kerala
(d) Mr. Pramod Sawant - Goa

Q66. In which state is the 'Badampahar' iron-ore mine located?

(a) Odisha
(b) Karnataka
(c) Madhya Pradesh
(d) Maharashtra

Q67. The 'Amar Jawan Jyoti' (Flame of the Immortal Soldier) was installed at the _____ in January 1972.

(a) Wagah Border
(b) Jaisalmer War Memorial
(c) India Gate
(d) Gateway of India

Q68. A milkman mixes 10% water in pure milk but he is not content with it. So, he again mixes 10% more water in the previous mixture. What is the profit percentage of milk if he sells it at cost price?

(a) 20%
(b) 12.1%
(c) 21%
(d) 11.11%

Q69. If cover d = 1 ÷ 3over4, then c+dover c-d = ?

(a) -7
(b) 7
(c) 4over3
(d) 7over4

Q70. Who among the following is known as the 'Meera of Modern India'?

(a) Mahasweta Devi
(b) Ashapoorna Devi
(c) Mahadevi Verma
(d) Kamala Das

Q71. The Microsoft Corporation was founded at _____ in 1975.

(a) Albuquerque, New Mexico, United States
(b) Cupertino, California, United States
(c) Nihonbashi, Tokyo, Japan
(d) Bellevue, Washington, United States

Q72. The Pittsburgh industrial region is located in:

(a) England
(b) Japan
(c) the United States of America
(d) Germany

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Q73. During his morning walk, Vidhyanshu faced towards the sun and walked a few kilometres. After some time, he turned to his right and walked 5 km. Then, he again turned to his right and continued walking. Finally, in which direction was vidhyanshu moving?

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

Q74. The value of √[5]32/243 is _____.

(a) 2over3
(b) 5over2
(c) 3over2
(d) 5over3

Q75. Which of the following is NOT a part of our solar system?

(a) Europa
(b) Moon
(c) Pole Star
(d) Sun

Q76. The best-known pastoral and hunter-gatherer tribes, the 'Mongols', inhabited _____.

(a) Central Asia
(b) Arabian Peninsula
(c) South Asia
(d) South-East Asia

Q77. Out of the four numbers given, three are alike in some manner and one is different. Select the number that is different from the rest.

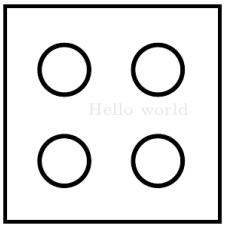
169, 289, 144, 356

(a) 356
(b) 144
(c) 169
(d) 289

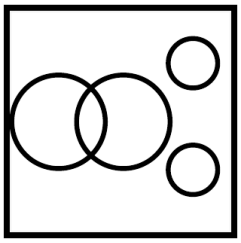
Q78. Select the Venn diagram that best represents the relationship between the following classes.

Rivers, Lakes, Mountains, Water bodies

(a)

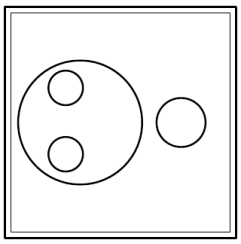


(b)

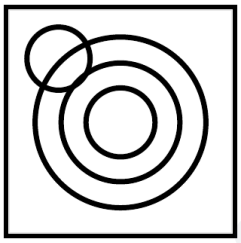


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(c)



(d)



Q79. Select the option that is related to the third term in the same way as the second term is related to the first term.

Mason : Builds :: Mechanic : ?

(a) Repairs
(b) Tools
(c) Factory
(d) Cars

Q80. If $a + b + c = 5$ and $a^2 + b^2 + c^2 = 29$, then the value of $ab + bc + ca$ = ?

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

Q81. Which satellite was launched by PSLV-C51 on 28 February 2021?

(a) IRS-2
(b) SROSS-C
(c) Amazonia-1
(d) Landsat-3

Q82. Who led the East India Company's army during the Battle of Plassey in 1757?

(a) Robert Clive
(b) William Babington
(c) Robert Bowles
(d) Charles Boys

Q83. If $x = 3 \cos A \cos B$, $y = 3 \cos A \sin B$ and $z = 3 \sin A$, find the value of $x^2 + y^2 + z^2$

(a) 12
(b) 6
(c) 3
(d) 9

Q84. If $2 (\cos \theta + \sec \theta) = 5$, what is the value of $\sec^2 \theta + \cos^2 \theta$?

(a) 17over4
(b) 5over4
(c) 25over2
(d) 4over17

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Q85. Express - - 40/56 as a rational number whose numerator is -5.

(a) • 5/18
(b) • 5/7
(c) • 5/8
(d) • 5/6

Q86. Study the following table and answer the question that follows.

Rate of Employment (in percent) at Various Levels across 4 years				
Year	Primary level	Secondary level	Higher level	Total
1995	15	12	15	42
2000	20	18	20	58
2005	25	20	10	55
2010	30	25	15	70

Which of the following statements about the rate of employment at various levels is NOT true?

(a) The ratio of the rate of higher level employment to the total employment rate was the same in 1995 and 2010.
(b) The highest rate of secondary level employment was in 2010.
(c) The lowest rate of primary level employment was in 1995.
(d) The lowest rate of higher level employment was in 2005.

Q87. The given table presents the marks obtained by a student in various subjects in the first term and second terms, out of hundred in each test.

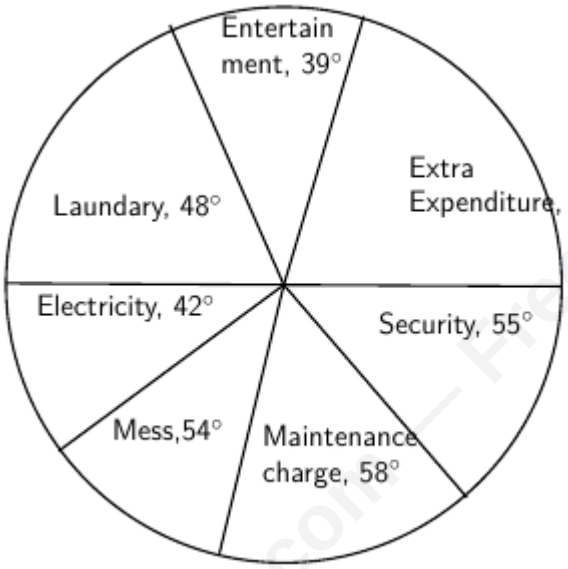
Subject	**English**	**Hindi**	**Mathematics**	**Science**	**Social science**
Marks obtained in first term	65	70	88	82	71
Marks obtained in second term	67	68	94	85	75

In which subject did the student improve his performance the least?

(a) Hindi
(b) Science
(c) English
(d) Social science

Q88. The given circle graph shows the spending (in Rs. lakhs) of a private hostel on various expenses during a particular year. Answer the given question based on the circle graph.

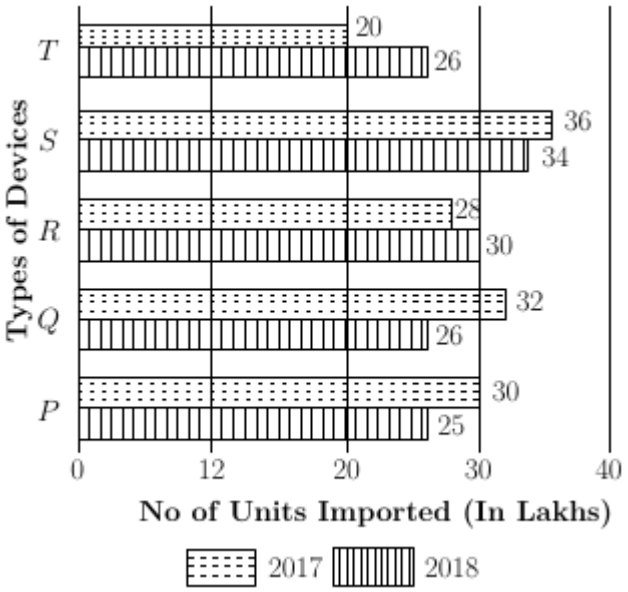
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If the total expenditure incurred by the hostel during the year was 50 lakhs, then how much was spent on maintenance charges and security together (approximately)?

(a) 41 Lakhs
(b) 8 Lakhs
(c) 21 Lakhs
(d) 16 Lakhs

Q89. Study the given bar graph showing the total number of different types of electronic devices P, Q, R, S and T (in lakh units) imported by a company in 2017 and 2018 and answer the question that follows.



From 2017 to 2018, which of the following types of devices had the maximum percentage change (increase or decrease) in the number of imported devices?

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

Q90. Study the given pattern carefully and select the letter from the given options that can replace the question mark (?) in it.



(a) F
(b) A
(c) M
(d) E

Q91. Four letter-pairs have been given, out of which three are alike in some manner and one is different. Select the letter-pair that is different from the rest.

(a) ZE
(b) JO
(c) WC
(d) NS

Q92. If in a certain code language, A is written as 1 and AIR is written as 28, then how will AIRCRAFT be written as in that language?

(a) 80
(b) 78
(c) 76
(d) 82

Q93. In a certain code language, FEATURE is written as HICXWVG. How will ALMOST be written as in that language?

(a) CPOSUX
(b) CPOSWX
(c) CNQQWX
(d) CNQSWX

Q94. Without assuming anything beyond the given information, select the correct nature of relationship between the two events A and B.

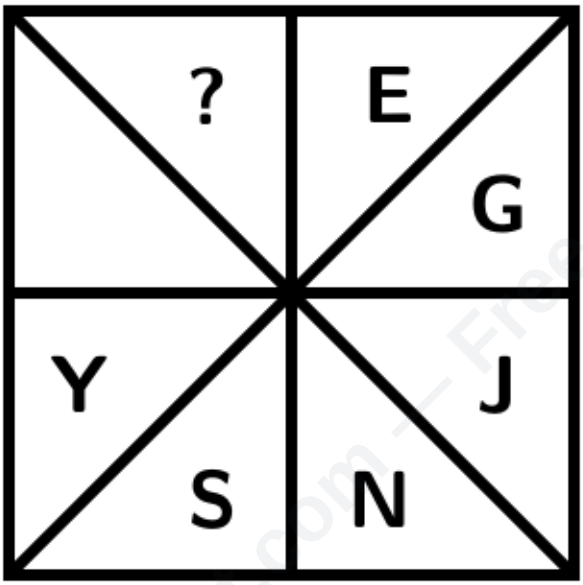
Event A: Philips joined a gym recently.

Event B: Philips has been looking a lot fitter now.

(a) A is the effect and B is its immediate and principal cause.
(b) B is the effect but A can never be its immediate and principal cause.
(c) A is the effect but B is not its immediate and principal cause.
(d) B is the effect and A is its immediate and principal cause.

Q95. Study the given pattern carefully and select the letter from the given options that can replace the question mark (?) in it.

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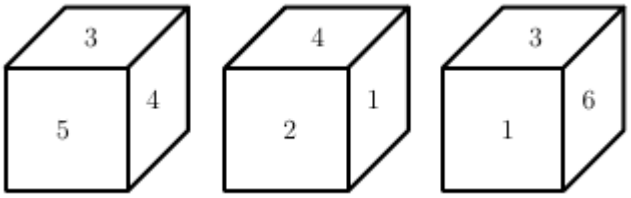


(a) X
(b) W
(c) N
(d) P

Q96. Select the number from among the given options that can replace the question mark (?) in the following series.
123, 267, 436, 632, ?

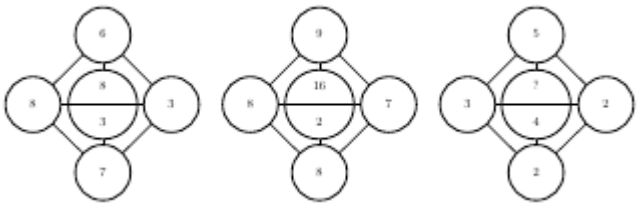
(a) 923
(b) 857
(c) 797
(d) 913

Q97. Three different positions of the same dice are given. Which number will be on the face opposite to the face with the number '2'?



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

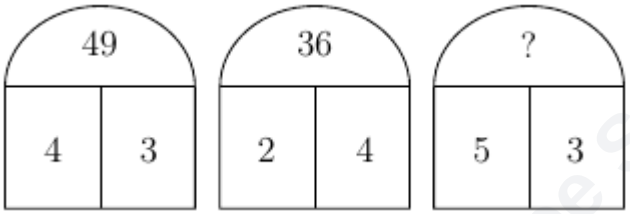
Q98. Study the given pattern carefully and select the number from the given options that can replace the question mark (?) in it.



(a) 6
(b) 10
(c) 12
(d) 3

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Q99. Study the given pattern carefully and select the number from the given options that can replace the question mark (?) in it.



(a) 36
(b) 81
(c) 64
(d) 16

Q100. On the basis of the top five students' result analysis, a class teacher found that Lokesh and Sumit are good in Insurance and Banking; Arun and Lokesh are good in Accounts and Banking; Arun, Pankaj and Surendra are good in Economics and Accounts; Surendra and Arun are good in Geography and Accounts: and Pankaj and Sumit are good in Economics and Insurance. Who is good in Insurance, Accounts and Economics?

(a) Sumit
(b) Arun
(c) Pankaj
(d) Surendra

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) 12 km/hr

Given:
Speed while going = 15 km/hr.
Speed while returning = 10 km/hr.
Formula Used:
Average speed = Total distance travelled/Total Time
Calculation:
Let the distance be d km.
Time taken to go = d / 15
Time taken to return = d / 10
Total Distance = d + d = 2d
Total Time = (d / 15) + (d / 10)
Total Time = d(1/15 + 1/10)

Total Time = d(2/30 + 3/30)

Total Time = d(5/30)

Total Time = d(1/6)

Average Speed = (2d) / (d/6)

Average Speed = 2d × 6 / d

Average Speed = 12 km/hr

The average speed is 12 km/hr.

Q2. Answer: (d) Oil India Limited

The correct answer is Oil India Limited.

Key Points

• Oil India Limited (OIL) is under the administrative structure of the Ministry of Petroleum and Natural Gas.

• The Ministry of Petroleum and Natural Gas is responsible for the exploration, production, refining, distribution, marketing, import, export, and conservation of petroleum, natural gas, and petroleum products.

• OIL is a government-owned company that plays a crucial role in the energy sector of India, focusing on the exploration, development, and production of crude oil and natural gas.

• The Ministry oversees various public sector undertakings (PSUs) related to petroleum and natural gas, ensuring the energy security of the country.

Additional Information

• The Ministry of Petroleum and Natural Gas was formed in 1947 and has since played a significant role in the development of the petroleum industry in India.

• The Ministry's responsibilities include policy formulation, coordination, and regulation of the petroleum and natural gas industries in India.

• It works towards ensuring the availability of petroleum products at reasonable prices and promotes the conservation of petroleum products.

• The Ministry is also involved in international cooperation and partnership in the energy sector to enhance India's energy security.

• OIL, under the Ministry's guidance, has expanded its operations both domestically and internationally, contributing significantly to India's energy needs.

Q3. Answer: (d) Brahmani

The correct answer is Brahmani.

Key Points

• NW-5 consists of the stretches from Talcher to Dhamra on the Brahmani River a distance of 265 km including the Kharsua and Dhamra river systems, the Geonkhali–Charbatia stretch of the East Coast Canal of 217 km, the Charbatia–Dhamra stretch of Matai River of 40 km and the Mangalgadi–Paradip stretch of the Mahanadi River Delta running for 101 km.

• The waterway also includes a 91 km stretch in Bengal between Geonkhali and Nasirabad, West Bengal.

Additional Information

The Inland Waterways Authority of India (IWAI)

• It came into existence on 27th October 1986 for development and regulation of inland waterways for shipping and navigation.

• The head office of the Authority is at Noida.

• The Authority primarily undertakes projects for development and maintenance of IWT infrastructure on national waterways through grant received from the Ministry of Shipping.

Notes on National Waterways

• National Waterway-1: Allahabad-Haldia stretch of the Ganga-Bhagirathi-Hooghly river (Total length-1620 km) in the states of Uttar Pradesh, Bihar, Jharkhand and West Bengal.

• National Waterway-2: Sadiya-Dhubri stretch of the Brahmaputra river (Total length-891 km) in the state of Assam.

• National Waterway-3: Kollam-Kottapuram stretch of West Coast Canal and Champakara and Udyogmandal canals (Total length-205 km) in the state of Kerala.

• National Waterway-4: (Total length-1027 km) in the states of Andhra Pradesh and Tamil Nadu and the Union Territory of Puducherry.

• National Waterway-5: (Total length- 588 km) in the states of West Bengal and Odisha.

• National Waterway-6: National Waterways 6 is a waterway between Lakhipur and Bhanga of the Barak River with a length of 121 km.

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Q4. Answer: (a) The Discovery of India

The correct answer is The Discovery of India.

Key Points

• The Discovery of India was written by India's first Prime Minister Pandit Jawaharlal Nehru during his imprisonment in 1942–1945 at Ahmednagar fort.

• It was originally published on 14 November 1946.

• The journey in The Discovery of India begins with ancient history, leading up to the last years of the British Raj.

• He also wrote books named ‘Meri Kahani’ and ‘Glimpses of World History’ during his prison life.

Additional Information

Dr APJ. Abdul Kalam was the 11th President of India.

• He served as the president of India from 2002 to 2007.

• He was the first scientist to become the president of India.

• He is well known as the "missile man of India".

• He was honored with the Bharat Ratna award in 1997.

• He died on 27th July 2015

• "Wings of Fire" is the autobiography of Dr. APJ. Abdul Kalam

• Notable works are:

• The luminous spark.

• India 2020.

• Mission India

• Ignited Minds.

• Indomitable Spirit.

• Inspiring Thoughts.

Q5. Answer: (a) 7 km/hr

Given:

Distance covered in the first part = 30 km

Speed in the first part = 6 km/hr

Distance covered in the second part = 40 km

Time taken in the second part = 5 hrs

Formula Used:

Average speed = Total distance travelled / Total time

Calculation:

Time taken in the first part = 30 km / 6 km/hr

Time taken in the first part = 5 hrs

Total Distance = 30 km + 40 km = 70 km

Total Time = 5 hrs + 5 hrs = 10 hrs

Average Speed = Total Distance / Total Time

Average Speed = 70 km / 10 hrs

Average Speed = 7 km/hr

The average speed for the whole journey is 7 km/hr.

Q6. Answer: (b) $(P^2 - q^2)/(P^2 + q^2)$

Given:

$\tan \theta = p/q$

We need to simplify:

$(p \sin \theta - q \cos \theta) / (p \sin \theta + q \cos \theta)$

Use trigonometric relationships:

From $\tan \theta = p/q$, we know:

$\sin \theta = p / \sqrt{(p^2 + q^2)}$

$\cos \theta = q / \sqrt{(p^2 + q^2)}$

Substitute $\sin \theta$ and $\cos \theta$ into the expression:

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The numerator becomes:

$p \sin \theta - q \cos \theta = p \times (p / \sqrt{(p^2 + q^2)}) - q \times (q / \sqrt{(p^2 + q^2)})$

$= (p^2 - q^2) / \sqrt{(p^2 + q^2)}$

The denominator becomes:

$p \sin \theta + q \cos \theta = p \times (p / \sqrt{(p^2 + q^2)}) + q \times (q / \sqrt{(p^2 + q^2)})$

$= (p^2 + q^2) / \sqrt{(p^2 + q^2)}$

Simplify the fraction:

$(p \sin \theta - q \cos \theta) / (p \sin \theta + q \cos \theta) = [(p^2 - q^2) / \sqrt{(p^2 + q^2)}] / [(p^2 + q^2) / \sqrt{(p^2 + q^2)}]$

$= (p^2 - q^2) / (p^2 + q^2)$

Therefore, the simplified value is: $(p^2 - q^2) / (p^2 + q^2)$.

Q7. Answer: (c) Inland Emigration Act, 1859

The correct answer is Inland Emigration Act, 1859.

Key Points

• The Inland Emigration Act of 1859 was a piece of legislation enacted in colonial India during British rule.

• It was primarily aimed at regulating the movement of Indian labourers, particularly from rural areas, to urban centres within the country.

• Under the Act, the colonial government sought to address the perceived problems arising from the influx of labourers from rural areas into cities.

• One of the main concerns was the potential strain on resources and infrastructure in urban centres, as well as the potential for social unrest.

• The Act established a system of licensing for labourers migrating from one district to another within the country.

• Labourers were required to obtain a permit or license from the local authorities, specifying the purpose and duration of their travel.

• The authorities had the power to refuse or restrict migration based on various factors, such as the availability of employment opportunities, public health concerns, and the maintenance of law and order.

• The Act also empowered local magistrates to regulate and supervise the recruitment of labourers for specific employment purposes.

• It aimed to prevent fraudulent practices and exploitation by intermediaries involved in labour recruitment.

• Critics of the Inland Emigration Act argued that it curtailed the freedom of movement of Indian labourers and perpetuated a system of control and exploitation by the colonial government and private employers.

• They contended that the legislation served the interests of the British administration and industrialists by providing a legal framework to manipulate the labour market and suppress wages.

• Over time, the Act underwent amendments and modifications in response to changing socioeconomic conditions and political pressures.

Q8. Answer: (d) Feroz Shah Kotla ground

The correct answer is Feroz Shah Kotla ground.

Key Points

• The Hindustan Socialist Republican Association (HSRA) was established in the year 1928.

• Youths influenced by socialist ideas decided to establish a nationwide revolutionary organization. Chandrashekhar Azad, Bhagat Singh, Rajguru, Sukhdev etc. were prominent among them. In 1928, these youths established an organization called 'Hindustan Socialist Republican Association' in a meeting held at Feroz Shah Kotla Maidan in Delhi.

• The objective behind the establishment of this organization was to free India from British exploitation and to uproot the unjust socio-economic system that exploited the farmers and workers.

Additional Information

Organization	Revolutionary
Abhinav Bharat	Vinayak Damodar Savarkar
Anushilan Samiti	Barindrakumar Ghosh
Gadar	Lala Hardayal, Bhai Parmanand, Dr. Pandurang Sadashiv Khankhoje
Hindustan Republican Association	Ramprasad Bismil, Jogesh Chandra Chatterjee and Sachin Sanyal

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Q9. Answer: (d) Rs. 31,000

Given:

Principal (P) = Rs. 1,000,000

Rate (R) = 10% p.a.

Time (T) = 3 years

Formula used:

Simple Interest (SI) = P × R × T / 100

Compound Interest (CI) = P(1 + R/100)^T - P

Earning of HUDCO = Compound Interest earned - Simple Interest paid

Calculation:

Simple Interest:

SI = Rs. 1,000,000 × 10 × 3 / 100

=> SI = Rs. 300,000

Compound Interest:

CI = Rs. 1,000,000 × $(1 + 10/100)^3$ - Rs. 1,000,000

=> CI = Rs. 1,000,000 × $(1.1)^3$ - Rs. 1,000,000

=> CI = Rs. 1,000,000 × 1.331 - Rs. 1,000,000

=> CI = Rs. 1,331,000 - Rs. 1,000,000

=> CI = Rs. 331,000

Earning of HUDCO:

Earning = CI - SI

=> Earning = Rs. 331,000 - Rs. 300,000

=> Earning = Rs. 31,000

Therefore The earning of HUDCO is Rs. 31,000.

Q10. Answer: (c) 1974

The correct answer is 1974.

Key Points The Water (Prevention and Control of Pollution) Act, 1974, is an important legislation in India aimed at preventing and controlling water pollution. It was enacted to ensure the maintenance and restoration of the wholesomeness of water. The Act provides for the establishment of Central and State Pollution Control Boards to oversee and enforce the provisions of the Act.

Additional Information

• Objective:

• The primary objective of the Act is to prevent and control water pollution and to maintain or restore the wholesomeness of water in the country.

• Establishment of Boards:

• The Act led to the establishment of the Central Pollution Control Board (CPCB) at the national level and State Pollution Control Boards (SPCBs) at the state level. These bodies are responsible for implementing the Act's provisions and ensuring compliance.

• Functions of the Boards:

• The CPCB and SPCBs are tasked with planning comprehensive programs for the prevention, control, and abatement of water pollution.

• They advise governments on water pollution matters and coordinate activities to prevent and control water pollution.

• Consent Mechanism:

• Industries and municipalities are required to obtain consent from the respective Pollution Control Boards before discharging any sewage or trade effluent into water bodies.

• Penalties:

• The Act prescribes penalties for non-compliance, including fines and imprisonment, to enforce adherence to pollution control norms.

• Amendments:

• The Act has been amended several times to address emerging challenges and to strengthen the regulatory framework. Significant amendments were made in 1988 to enhance the enforcement capabilities of the Pollution Control Boards.

• Integration with Other Laws:

• The Water Act works in conjunction with other environmental laws such as the Air (Prevention and Control of Pollution) Act, 1981, and the Environment (Protection) Act, 1986, to provide a comprehensive framework for environmental protection in India.

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• Public Participation:

• The Act encourages public participation and awareness through campaigns and programs aimed at educating the masses about the importance of preventing water pollution.

Q11. Answer: (d) docx

The correct answer is docx.

Key Points

• .wav file is used as an extension for an audio file. It is just like an MP3 extension that has more clarity and bigger in size.

• .xls file is used as an extension of MS Excel for spreadsheets.

• .pdf is a portable document format developed by Adobe to presents documents which include text and images and is independent of application software/operating system.

• .docx is used as an extension of Microsoft Word. A file with the .docx file extension is a Microsoft Word Open XML Format Document file.

• .docx files are XML-based and can contain text, objects, styles, formatting, and images, all of which are stored as separate files and ultimately compacted in a single, ZIP-compressed DOCX file. Microsoft started using DOCX files in Microsoft Word beginning in Word 2007. Earlier versions of Word use the DOC file extension.

Q12. Answer: (b) Measuring Tape

The logic followed here is:

Logic: Measurement Instruments.

Here,

Balance : Weight → Balance is an instrument used to measure Weight.

Similarly,

Measuring Tape : Length → Measuring Tape is an instrument used to measure Length.

Hence, the correct answer is "Option 2".

Q13. Answer: (d) 40 kg

Given:

Initial ratio of sand and cement = 9 : 2

After adding 20 kg of sand and 10 kg of cement, the new ratio = 4 : 1

Formula Used:

Ratio equation: sand/cement = 9/2

Ratio equation after adding: (sand + 20)/(cement + 10) = 4/1

Calculation:

Let the initial quantity of sand be 9x kg and cement be 2x kg.

After adding,

sand = 9x + 20

cement = 2x + 10

According to the new ratio:

(9x + 20)/(2x + 10) = 4

Cross-multiplying:

9x + 20 = 4(2x + 10)

=> 9x + 20 = 8x + 40

=> 9x - 8x = 40 - 20

=> x = 20

Initial quantity of cement = 2x = 2 × 20 = 40 kg

The initial quantity of cement in the mix was 40 kg.

Q14. Answer: (b) four-chambered

The correct answer is four-chambered.

Key Points

• The Heart is divided into chambers or rooms which help in avoiding intermixing of Oxygenated and Deoxygenated blood.

• All the reptiles except Crocodiles have three chambered heart.

• Crocodile has four chambered heart.

• A frog's heart has three Chambers.
• Lizard has three chambered heart.
• Shark has two chambered heart.

Q15. Answer: (a) Father

Given: Pointing at a picture of a boy, Shreyas said, "He is the son of the only brother of my father's daughter."

Here, 'my father's daughter' means, Shreya's father's daughter, thus Shreyas is a male member of the family. Therefore, if Shreyas has a sister, her only brother is Shreyas himself.

Thus, Shreyas is the boy's father.

Hence, the correct answer is "Option 1".

Q16. Answer: (c) 115

Given: 17 + 7 ÷ 27 - 3 × 13 = ?

Decoding the given information:

Symbol	•	÷	•	×
Means	×	•	÷	•

Now replacing the sign from left to right using BODMAS Rule, we get:

=> 17 × 7 + 27 ÷ 3 - 13

= 119 + 27 ÷ 3 - 13

=> 119 + 9 - 13

= 128 - 13 = 115

Hence, the correct answer is "Option 3".

Q17. Answer: (c) 18 cm

Given:

Volume of the cuboid = 54 cm × 18 cm × 6 cm

Volume of the cube = Volume of the cuboid

Formula Used:

Volume of a cuboid = length × width × height

Volume of a cube = side^3

Calculation:

Volume of the cuboid = 54 × 18 × 6

Volume of the cuboid = 5832 cm^3

Let the side of the cube be s cm.

Volume of the cube = s^3

Since Volume of the cube = Volume of the cuboid

=> s^3 = 5832

=> s = cbrt5832

=> s = 18 cm

The length of the side of the cube is 18 cm.

Q18. Answer: (c) 8/11, 11/15

Given:

Fractions: 5/7 and 3/4

Formula used:

Find two fractions between two given fractions by expressing them with a common denominator.

Calculation:

Convert 5/7 and 3/4 to fractions with a common denominator:

=> Least Common Denominator (LCD) of 7 and 4 = 28

=> 5/7 = 20/28

=> 3/4 = 21/28

Find fractions between 20/28 and 21/28:

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8/11, 11/15 lies between 20/28 and 21/28.

The correct answer is Option 3.

Q19. Answer: (c) ratification of the land boundary agreement between India and Bangladesh

The correct answer is ratification of the land boundary agreement between India and Bangladesh.

Key Points

Constitution (100th Amendment) Act 2015

• Constitution (100th Amendment) Act 2015 ratified the land boundary agreement between India and Bangladesh.

• The act amended the 1st schedule of the constitution to exchange the disputed territories occupied by both the nations in accordance with the 1974 bilateral LBA.

• India received 51 Bangladeshi enclaves (covering 7,110 acres) in the Indian mainland, while Bangladesh received 111 Indian enclaves (covering 17,160 acres) in the Bangladeshi mainland.

• The Land Boundary Agreement entered into force on 6 June 2015. Implementation of the Land Boundary Agreement deals with three outstanding border issues, relating to:

(i) Adverse possessions;

(ii) Enclaves; and

(iii) An undemarcated land boundary of approximately 6.1 km.

Additional Information

Importance of this agreement

• Boundary disputes (whether relating to land or maritime boundaries) between neighbouring territories can cause significant risk and difficulties for companies looking to operate or invest in the disputed areas.

• In the energy sector in particular, boundary uncertainties have the potential to curb exploration or to create uncertainty in ownership of oil or gas.

• They also introduce risk to those who seek to invest in other sectors (for example, infrastructure, construction and telecommunications), which is particularly significant where the dispute itself may have led to under-development of essential services.

• The implementation of the Land Boundary Agreement has paved the way for significant cross-border investment by Indian investors in Bangladesh and will offer increased opportunities for foreign investment from further afield.

• In the energy sector, the two countries have indicated that an annual India-Bangladesh Energy Dialogue will be introduced between energy Ministers from both countries. The dialogue will undertake comprehensive energy sector cooperation including in areas of coal, natural gas, LNG, supply of petroleum products in the sub-region, renewable energy and oil and gas pipeline.

Q20. Answer: (b) 1998

The correct answer is 1998.

Key Points

• IBM Corporation is one of the world's largest technology and consulting companies, known for its innovation in computing technology.

• The full form of IBM stands for International Business Machines, reflecting its global outreach and emphasis on business solutions.

• Founded in 1911, IBM originally started as a company that manufactured machinery for business applications.

• IBM has played a crucial role in the development of computer technology, including hardware, software, and services.

Additional Information

• Historical Context: IBM was established as the Computing-Tabulating-Recording Company (CTR) through the merger of four companies and was renamed International Business Machines in 1924.

• Product Range: IBM offers a wide range of products and services, including cloud computing, artificial intelligence, hardware, and software solutions.

• Research and Development: IBM has a strong focus on R&D, leading to numerous patents and innovations in various fields, including quantum computing.

• Corporate Social Responsibility: IBM is also known for its commitment to corporate social responsibility and sustainability initiatives worldwide.

Q21. Answer: (a) Panchayati Raj

The correct answer is Panchayati Raj.

Key Points

• Panchayati Raj

• Panchayati Raj is a system of governance in which gram panchayats are the basic units of administration.
• It is a decentralized form of government where each village or group of villages is responsible for its own affairs.
• The concept aims at transferring decision-making power to local governments to enhance local self-governance.
• This system promotes the participation of the local community in the decision-making process and development of their area.

Additional Information

• Lok Sabha
• The maximum strength of the Lok Sabha can be 550 members.
• Out of these 550 members, 530 members are elected from the States, and 20 members are elected from the Union Territories.
• President has the power to summon or prorogue the Houses of Parliament and to dissolve the Lok Sabha.
• Legislative assembly
• Every state in India has a Legislative Assembly.
• Each state is divided into different areas or constituencies. For example, the state of Rajasthan is divided into 200 assembly constituencies.
• From each constituency, the people elect one representative who then becomes a Member of the Legislative Assembly (MLA).
• Members of the Legislative Assembly (MLAs) are elected by the people.
• They then become members of the legislative assembly and also form the government.
• In this way we say that the MLAs represent people.
• Rajya Sabha
• The term of members of Rajya Sabha is 6 years and one-third members retire after every 2 years.
• Also, one-third of Rajya Sabha members retire every 2 years, so the total tenure should be three times that of two years.
• The 'Council of States' also known as Rajya Sabha, a nomenclature announced by the Chairman in the House on 23 August 1954, has its own distinctive features.
• The origins of the Second House can be traced back to the Montagu-Chelmsford Report of 1918.
• Qualifications of Rajya Sabha Member:
• Article 84 of the Constitution lays down the qualifications for membership in Parliament.
• A person to be qualified for membership of the Rajya Sabha should possess the following qualifications:
• he must be a citizen of India and make and subscribe before some person authorized on that behalf by the Election Commission an oath or affirmation according to the form set out for the purpose in the Third Schedule to the Constitution;
• he must be not less than 30 years of age;
• he must possess such other qualifications as may be prescribed on that behalf by or under any law made by Parliament.

Q22. Answer: (a) 1 month after Raja started the business

Given:

Raja's capital = Rs. 4400

Ranga's capital = Rs. 2400

Total annual profit = Rs. 1200

Raja's share of the profit = Rs. 800

Formula Used:

Share of profit = (Capital × Time) / Total capital-time ratio

Calculation:

Let Ranga join after x months.

Raja's investment time = 12 months

Ranga's investment time = (12 - x) months

Raja's share of profit = (Raja's capital × Raja's investment time) / (Raja's capital × Raja's investment time + Ranga's capital × Ranga's investment time)

=> 800 = (4400 × 12) / (4400 × 12 + 2400 × (12 - x)) × 1200

=> 800 / 1200 = (4400 × 12) / (4400 × 12 + 2400 × (12 - x))

=> 2 / 3 = 52800 / (52800 + 2400 × (12 - x))

=> 2 / 3 = 52800 / (52800 + 28800 - 2400x)

=> 2 / 3 = 52800 / (81600 - 2400x)

=> 2 × (81600 - 2400x) = 3 × 52800

=> 163200 - 4800x = 158400

=> 163200 - 158400 = 4800x

=> 4800 = 4800x

=> x = 1

Ranga joined the business 1 month after Raja started the business.

Q23. Answer: (a) Only conclusions II and III follow.

The least possible Venn diagram for the given statements is as shown below :

Conclusions:

I. Some fans are fridges → Does not follow (As no mixer is a fridge and all fans are mixers. So it is possible but not definite.)

II. Some machines are not mixers → Follow (As some mixers are machines and no mixer is a fridge. As some part of machines is common with fridges which cannot be mixers, therefore it is true.)

III. No fan is a fridge → Follow (As no mixer is a fridge and all fans are mixers. As whole fans comes in mixers which cannot be fridges, therefore it is true.)

Therefore Here, Only conclusions II and III follow.

Hence, the correct answer is "Option 1".

Q24. Answer: (c) 2015

The correct answer is 2015.

Key Points

• Pradhan Mantri Awas Yojana – Urban (PMAY-U), a flagship Mission of the Government of India being implemented by the Ministry of Housing and Urban Affairs (MoHUA), was launched on 25th June 2015.

• The Mission addresses urban housing shortage among the EWS/LIG and MIG categories including the slum dwellers by ensuring a pucca house for all eligible urban households by the year 2022 when India completes 75 years of its independence.

Additional Information

• The status of PMAY-U as on 15 September 2022 is-

Q25. Answer: (b) 18

Given:

A and B can do a piece of work in 6 days.

A alone can do it in 9 days.

Formula Used:

Work done by A and B together in 1 day = 1/6

Work done by A alone in 1 day = 1/9

Work done by B alone in 1 day = Work done by A and B together in 1 day - Work done by A alone in 1 day

Calculation:

Work done by A and B together in 1 day = 1/6

Work done by A alone in 1 day = 1/9

Work done by B alone in 1 day = 1/6 - 1/9

=> Work done by B alone in 1 day = 1/6 - 1/9

=> Work done by B alone in 1 day = (3 - 2)/18

=> Work done by B alone in 1 day = 1/18

Time taken by B alone to complete the work = 18 days

The correct answer is option 2.

Q26. Answer: (a) 3 : 4

Given:

Capital investment by A = Rs. 7500

Capital investment by B = Rs. 8000

Time for which A invested = 8 months

Time for which B invested = 10 months

Formula Used:

Ratio of profit = (Capital × Time) of A : (Capital × Time) of B

Calculation:

Capital × Time for A = 7500 × 8

Capital × Time for B = 8000 × 10

=> 7500 × 8 = 60000

=> 8000 × 10 = 80000

Ratio of profit = 60000 : 80000

=> 3 : 4

The ratio in which they divide the profit is 3 : 4.

Q27. Answer: (b) 34.83 lakh crore

The correct answer is 34.83 lakh crore.

Key Points

• Union Budget 2021-2022 is the ninth budget under Modi government.

• Union Budget 2021-2022 was presented by the Union Finance Minister Nirmala Sitharaman in Lok Sabha on 1st February 2021.

• It was her third budget under the Modi government.

• It is the first paperless Union Budget in India.

• Nirmala Sitharaman's third budget speech was focussed on Centre's Atmanirbhar Bharat vision.

• The budget made no changes in personal income tax slabs and a slew of hike in customs duty to benefit Make in India.

Additional Information

• The Union Budget of India is referred to as the Annual Financial Statement in the Article 112 of the Indian constitution.

• The Union Budget of India is presented by the Finance Minister in Parliament.

• The Union Budgets presented under the Modi government are:

1. The Union Budget of India for 2014–2015 by Arun Jaitley
2. The Union Budget of India for 2015–2016 by Arun Jaitley.
3. The Union Budget of India for 2016–2017 by Arun Jaitley.
4. The Union Budget of India for 2017–2018 by Arun Jaitley.
5. The Union Budget of India for 2018–2019 by Arun Jaitley.
6. The Union Budget for 2019–2020 by Nirmala Sitharaman on 5th July 2019.
7. The Union Budget for 2020–2021 by Nirmala Sitharaman.
8. The Union Budget for 2021–2022 by Nirmala Sitharaman.

Q28. Answer: (d) 26 March

The correct answer is 26 March.

Key Points

• The Liberation War in Bangladesh was a revolution and armed conflict sparked by the rise of the Bengali nationalist in what was then East Pakistan during the 1971 Bangladesh genocide.

• It resulted in the independence of the People's Republic of Bangladesh.

• On 26 March 1971, Bangladesh was proclaimed as an independent nation by Sheikh Mujibur Rahman*.*

• Bangladesh celebrates 26th of March as its independence day.

Additional Information

• The war began after the Pakistani military junta based in West Pakistan launched Operation Searchlight against the people of East Pakistan on the night of 25 March 1971.

• The war ended on 16 December 1971 after West Pakistan surrendered.

• Indian Prime Minister Indira Gandhi had concluded that instead of taking in millions of refugees, India would be economically better off going to war against Pakistan.

• Operation Trident was an offensive operation launched by the Indian Navy on Pakistan's port city of Karachi during the Indo-Pakistani War of 1971.

Q29. Answer: (d) 11over4

Given:

The numbers are: -3/2, 3/2, 11/4, 5/2

Formula Used:

Compare the given fractions by converting them to a common denominator or to decimal form.

Calculation:

Converting the given numbers to decimal form:

-3/2 = -1.5

3/2 = 1.5

11/4 = 2.75

5/2 = 2.5

Comparing the decimal values, we get:

-1.5, 1.5, 2.75, 2.5

Among these, the greatest number is 2.75

The greatest number among the given options is 11/4.

Q30. Answer: (b) Canada

The correct answer is Canada.

Key Points

• The Rajasthan Atomic Power Station (RAPS; also Rajasthan Atomic Power Project - RAPP) is located at Rawatbhata in the state of Rajasthan, India.

• Rawatbhata Nuclear Power Station located in Rajasthan was established in 1975. It was established in collaboration with the Government of Canada. It is the second nuclear power plant in India.

• The first commercial nuclear power station in India is operated by India's Nuclear Power Corporation.

Additional Information

• Tarapur Atomic Power Station was constructed initially with two boiling water reactor (BWR) units under the 1963 123 Agreement between India, the United States, and the International Atomic Energy Agency (IAEA).

• Rourkela Steel Plant (RSP), in Rourkela, Odisha is the first integrated steel plant in the public sector in India. It was set up with West Germany

• The Kudankulam Civilian Nuclear Power Plant was built by India in joint collaboration with Russia.

Q31. Answer: (c) England

The correct answer is England.

Key Points

• The oldest of the Grand slam, Wimbledon is used to playing on Grass courts.

• The All England Lawn Tennis Club in London, UK, will host the grass-court tournament which was established in 1877.

• Wimbledon tennis is the only major tournament played on the grass court since Australian Open shifted to hardcourts in 1988.

• The First Wimbledon Gentlemen's Singles championship held in 1877 on July 9 was won by Spencer Gore.

Q32. Answer: (b) Bharat Biotech and ICMR-National Institute of Virology

The correct answer is Bharat Biotech and ICMR-National Institute of Virology.

Key Points

• Covaxin is an inactivated virus-based COVID-19 vaccine developed by Bharat Biotech in collaboration with the Indian Council of Medical Research - National Institute of Virology.

• Code named - BBV152.

• The vaccine is similar to CoronaVac in that it uses a complete infective SARS-CoV-2 viral particle consisting of RNA surrounded by a protein shell.

• They contain dead viruses, incapable of infecting people but still able to instruct the immune system to mount a defensive reaction against an infection.

• It is a 2-dose vaccination regimen given 28 days apart.

Additional Information

• Australian Government has recognized the Covaxin covid-19 vaccine of India on November 1, 2021.

• Highlights In India, Covaxin, and Covishield are the two widely used vaccines.

• Australia had recognized Covishield, already. The Therapeutic Goods Administration (TGA) of Australia has recognized Covaxin as well as BBIBP-CorV vaccines for establishing a traveler's vaccination status.

Q33. Answer: (c) 28, 81

Given:

Numbers: 28, 81

Formula Used:

Two numbers are co-primes if their Greatest Common Divisor (GCD) is 1.

Calculation:

Finding GCD of 28 and 81:

Prime factorization of 28: $2^2 \times 7$

Prime factorization of 81: 3^4

The common factors: None

=> GCD(28, 81) = 1

Since the GCD is 1, 28 and 81 are co-primes.

Q34. Answer: (c) Lord Dalhousie

The correct answer is Lord Dalhousie.

Key Points

• Lord Dalhousie

• The annexation of Awadh by Lord Dalhousie took place in the year 1856.

• Lord Dalhousie was the Governor-General of India from 1848 to 1856.

• The annexation was justified by Dalhousie under the pretext of misgovernment by the Nawab of Awadh.

• This event was one of the significant causes leading to the Indian Rebellion of 1857.

• The policy of annexation was part of Dalhousie's Doctrine of Lapse, which aimed at expanding British territories in India.

Additional Information

• Lord William Bentinck

• He was the first Governor-General of India, introduced the Indian Press Act of 1835, which granted freedom to the press. The act was also intended to increase British popularity, as newspapers and the press were becoming the primary means of reaching the largest number of people.

• In 1835, Bentinck agreed to revise the press laws after receiving petitions from English and vernacular newspaper editors. Hence, Option 4 is correct.

• In 1835, Sir Charles Metcalfe succeeded Bentinck and carried out the measure of granting complete freedom to the press.

• Bentinck was Governor-General of India from 1828–1835.

• He is credited with several significant social and educational reforms, including:

• Lord Minto was the governor-general of India.

• He was the 17th Viceroy of India.

• He became the Viceroy in 1905.

• His full name was Gilbert Elliot-Murray-Kynynmound, 1st Earl of Minto.

• Lord Minto Forbade propagandist preaching by the Baptist missionaries.

• Lord Warren Hastings

• Warren Hastings was the first Governor-General of India (bengal) from 1773 to 1785.

• During the reign of Warren Hastings, important acts like the Regulating act of 1773 and the Pitts India Act of 1784 were passed.

Q35. Answer: (d) 2 √2 m

Given:

Side of a right-angled isosceles triangle = 2 m.

Formula Used:

Hypotenuse h of a right-angled isosceles triangle with side a is given by:

$h = a\sqrt{2}$

Calculation:

Here, a = 2 m.

So, hypotenuse h is:

$\Rightarrow h = 2\sqrt{2}$ m

The hypotenuse of the right-angled isosceles triangle is $2\sqrt{2}$ m m.

Q36. Answer: (d) 101

Given:

We need to find the smallest three-digit prime number.

Formula Used:

A prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself.

Calculation:

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We will check each option to determine if it is a prime number:

Option 1: 103

103 is not divisible by any prime number less than its square root.

Prime check: 2, 3, 5, 7

103 is a prime number.

Option 2: 107

107 is not divisible by any prime number less than its square root.

Prime check: 2, 3, 5, 7

107 is a prime number.

Option 3: 109

109 is not divisible by any prime number less than its square root.

Prime check: 2, 3, 5, 7

109 is a prime number.

Option 4: 101

101 is not divisible by any prime number less than its square root.

Prime check: 2, 3, 5, 7

101 is a prime number.

Among the given options, 101 is the smallest three-digit prime number.

The correct answer is option 4.

Q37. Answer: (d) Kathmandu

The correct answer is Kathmandu.

Key Points

• South Asian Association for Regional Cooperation (SAARC) is an organization of South Asian nations, established on December 8, 1985.

• SAARC aims to promote economic and regional integration among its member countries.

• The current member countries are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

• The organization has its headquarters in Kathmandu, Nepal.

• SAARC's primary objectives include promoting the welfare of the peoples of South Asia and improving their quality of life, accelerating economic growth, social progress, and cultural development in the region.

Additional Information

• SAARC was established with the signing of the SAARC Charter in Dhaka, Bangladesh.

• Since its inception, SAARC has conducted several summits aimed at addressing regional issues and fostering cooperation.

• SAARC also includes nine observer states: Australia, China, the European Union, Iran, Japan, Mauritius, Myanmar, South Korea, and the United States.

• Various regional centers have been established under the auspices of SAARC to promote regional cooperation in specific areas, such as the SAARC Disaster Management Centre and the SAARC Agricultural Centre.

Q38. Answer: (a) Carpal bone - Neck

The correct answer is Carpal bone - Neck.

Key Points

• Carpal Bones

• Located in the wrist, connecting the hand to the forearm.

• Eight small, irregularly shaped bones arranged in two rows.

• Enable a wide range of hand movements, such as flexion, extension, abduction, and adduction.

• Contribute to the stability and flexibility of the wrist joint.

• Common site for fractures, particularly the scaphoid bone.

Additional Information

• Ulna Bone

• Located on the pinky side of the forearm.

• Longer of the two forearm bones.

• Forms the major part of the elbow joint.

• Plays a crucial role in forearm rotation (pronation and supination).

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• Prominent projection called the olecranon process forms the bony point of the elbow.
• Maxilla
• Forms the upper jawbone.
• Part of the facial skeleton.
• Houses the upper teeth in their sockets.
• Contributes to the shape and structure of the face.
• Plays a vital role in speech and chewing.
• Patella
• Triangular-shaped bone located in front of the knee joint.
• Embedded within the quadriceps tendon.
• Also known as the kneecap.
• Protects the knee joint and increases the leverage of the quadriceps muscles.
• Can be affected by conditions such as patellofemoral pain syndrome (runner's knee).

Q39. Answer: (a) Kangana Ranaut

The correct answer is Kangana Ranaut.

Key Points

• As of September 2020, Padma Shri is the most recent award given to film actress Kangana Ranaut.
• Kangana Ranaut is an Indian actress who appears predominantly in Hindi films.
• She has received several awards, including the Padma Shri, fourth highest civilian award in the Republic of India, four National Film Awards, four Filmfare Awards, three International Indian Film Academy Awards, and one award each from the Screen, Zee Cine, and Producers Guild award ceremony.
• In 2021, Ranaut won another National Film Award for Best Actress at the 67th National Film Awards for her performance in the 2019 Hindi period drama film Manikarnika: The Queen of Jhansi.
• In 2020, She won Padma Shri for the Hindi sports drama film Panga.
• This was Ranaut's 3rd win in the best actress category and overall her 4th National Award.

Q40. Answer: (d) RQRQ

Given series: QR_Q_R_Q_RRQ

So, checking each option one by one:

Option 1) QRQR → QRQQRRQQRRRQ → (It doesn't follow any pattern)

Option 2) RQQR → QRRQQRQQRRRQ → (It doesn't follow any pattern)

Option 3) QQRQ → QRQQQRRQQRRQ → (It doesn't follow any pattern)

Option 4) RQRQ → QRRQQRRQQRRQ → (It follows the pattern of QRR - QQR - RQQ - RRQ)

Hence, "Option 4" is the correct answer.

Q41. Answer: (c) 3, 1, 2, 4

The logic followed here is:

3. Karakoram - This range is the northernmost of the given ranges.

1. Ladakh - South of the Karakoram range.

2. Zaskar - South of the Ladakh range.

4. Pir Panjal - This range is the southernmost of the given ranges.

So, the order would be: 3, 1, 2, 4.

Hence, the correct answer is "Option 3".

Additional Information

Q42. Answer: (c) 12

The logic followed here is:

Logic: (Digital sum of 1st number) - (Digital difference of 2nd number) = 3rd number

For, 92 × 32 = 10

=> (9 + 2) - (3 - 2) = 10

=> 11 - 1 = 10

For, 73 × 41 = 7

=> (7 + 3) - (4 - 1) = 7

=> 10 - 3 = 7.

For, 26 × 78 = 9

=> (2 + 6) - (7 - 8) = 9

=> 8 - (-1) = 9

=> 8 + 1 = 9

Similarly,

33 × 28?

=> (3 + 3) - (2 - 8) = ?

=> 6 - (-6) = ?

=> 6 + 6 = 12

Hence, the correct answer is "Option 3".

Q43. Answer: (d) commutative

Given:

Expression: (-3) × (-7) = (-7) × (-3)

Formula used:

The commutative property of multiplication states that changing the order of factors does not change the product.

Calculation:

Check if the product remains the same:

=> (-3) × (-7) = 21

=> (-7) × (-3) = 21

Since the product is the same, this demonstrates the commutative property.

Therefore The property is commutative property of multiplication.

Q44. Answer: (c) M

Given:

1) K is shorter than N but taller than M.

N > K > M

2) J is taller than K but shorter than N.

N > J > K > M

Thus, according to the final arrangement, M is the shortest.

Hence, "Option 3" is the correct answer.

Q45. Answer: (c) Mother's father

Given:

1) B is the mother of C

2) D is the sister of C

3) C is the daughter of A

4) E is the son of D

Thus, A is E's maternal grandfather or mother's father.

Hence, the correct answer is "Option 3".

Q46. Answer: (d) 2

Given:

Expression: $\sin^2 5° + \sin^2 10° + \sin^2 80° + \sin^2 85°$

Formula used:

$\sin^2\theta + \cos^2\theta = 1$

Also, $\sin(90° - \theta) = \cos\theta$

Calculation:

$\sin^2 80° = \cos^2 10°$ and $\sin^2 85° = \cos^2 5°$

=> Expression becomes $\sin^2 5° + \sin^2 10° + \cos^2 10° + \cos^2 5°$

Using $\sin^2\theta + \cos^2\theta = 1$:

=> $\sin^2 5° + \cos^2 5° = 1$

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=> $\sin^2 10° + \cos^2 10° = 1$

=> Total = 1 + 1 = 2

Therefore The value is 2.

Q47. Answer: (c) The volunteers used to travel 25 miles per day.

The correct answer is The volunteers used to travel 25 miles per day.

Key Points

• In 1930, Gandhiji declared that he would lead a march to break the salt law.

• According to this law, the state had a monopoly on the manufacture and sale of salt.

• Mahatma Gandhi along with other nationalists reasoned that it was sinful to tax salt since it is such an essential item of our food.

• The Salt March related the general desire of freedom to a specific grievance shared by everybody, and thus did not divide the rich nd the poor.

• On 12 March, 1930 Gandhiji and his followers started Dandi March from Sabarmati Ashram.

• Thousands of satyagrahis and leaders like Sarojini Naidu joined him.

• They marched for over 240 miles from Sabarmati to the coastal town of Dandi where they broke the government law by gathering natural salt found on the seashore, and boiling sea water to produce salt.

• Mahatma Gandhi broke the salt law by picking up a lump of natural salt, at Dandi on 6th April 1930.

Q48. Answer: (a) 12over25

Given:

Percentage = 48%

Formula Used:

To express a percentage as a fraction, divide by 100 and simplify.

Calculation:

48% as a fraction:

48% = 48 / 100

Simplify by dividing both numerator and denominator by their greatest common divisor (GCD), which is 4.

=> 48 / 100 = (48 ÷ 4) / (100 ÷ 4)

=> 12 / 25

The correct answer is 12/25 (option 1).

Q49. Answer: (a) 6

Shortcut Trick

From the division rule, $43 = x \times q + (x - 5)$.

Simplifying the equation gives $48 = x(q + 1)$, meaning x is a factor of 48.

Since the remainder $(x - 5)$ must be non-negative, $x - 5 \geq 0 \Rightarrow x \geq 5$.

Factors of 48 that are greater than or equal to 5 are 6, 8, 12, 16, 24, and 48.

There are 6 such values of x.

Therefore The correct answer is 6.

Alternate Method

Given: Dividend = 43, Divisor = x, Remainder = x − 5.

Formula Used: Dividend = (Divisor × Quotient) + Remainder

Applying the values in the formula:

=> $43 = x \times q + (x - 5)$

=> $43 + 5 = xq + x$

=> $48 = x(q + 1)$

=> This implies that x must be a natural number factor of 48.

Constraint for Remainder (R): $0 \leq R < \text{Divisor}$

=> $0 \leq x - 5 < x$

=> $x - 5 \geq 0 \Rightarrow x \geq 5$

=> Factors of 48 are: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48.

=> Selecting factors where $x \geq 5$: {6, 8, 12, 16, 24, 48}

=> Total count of such values = 6.

Therefore The correct answer is 6.

Additional Information

Euclid's Division Lemma

For any two positive integers a and b, there exist unique integers q and r such that a = bq + r, where 0 ≤ r < b.

Remainder Properties

The remainder must always be smaller than the divisor and can never be negative.

Factors of a Number

If a = b × c, then both b and c are factors of a. The number of solutions often depends on the constraints placed on these factors.

Q50. Answer: (d) 3

Given:

Point from which the tangent is drawn: (2, 3)

Equation of the circle: $x^2 + y^2 = 4$

Formula Used:

Length of the tangent from a point (x1, y1) to the circle $x^2 + y^2 = r^2$ is given by:

Length = $\sqrt{(x1^2 + y1^2 - r^2)}$

Calculation:

Given point (x1, y1) = (2, 3)

Given circle equation $x^2 + y^2 = 4 \Rightarrow r^2 = 4$

Now, calculate the length of the tangent:

Length = $\sqrt{(2^2 + 3^2 - 4)}$

Length = $\sqrt{(4 + 9 - 4)}$

Length = $\sqrt{9}$

Length = 3

The length of the tangent from the point (2, 3) to the circle is 3.

Q51. Answer: (d) 13

According to the given Venn diagram:

The shaded region represents the number of females who are graduates are self-employed.

So, the number of females who are graduates are self-employed = (5 + 8) = 13

Hence, the correct answer is "Option 4".

Q52. Answer: (c) wind speed

The correct answer is wind speed.

Key Points

• Anemometer:It is an instrument used to measure the speed of the wind, which is a common weather station instrument, or to calculate any form of current gas.

• The term is derived from the Greek word anemos meaning wind which was first explained by Leon Battista Alberti who was an Italian artist and an architect in the year 1450.

• He used a mechanical anemometer which was placed perpendicular to the wind direction such that the wind velocity as indicated by the angle of inclination of the disc.

• Types of anemometer:

• Cup anemometer: This consists of four hemispherical cups that are mounted on one end of the horizontal arms at equal angles on a vertical shaft.

• Hotwire anemometer: This consists of thin wire which is heated up to a certain temperature slightly more than atmospheric temperature.

• Windmill anemometer: This is a mechanical device similar to the regular windmill used to calculate the velocity of the wind. It consists of the axis of rotation running parallel to the direction of the wind.

• Laser Doppler anemometer: A beam of light is used which is further split into two beams. The velocity is determined by calculating the amount of light that has been reflected.

• Sonic anemometer: Sound waves from this anemometer are used to obtain the speed of the wind. These waves are made to pass through the transducer. These find applications in aircraft and scientific wind turbines.

EXPLANATION:

• From the above discussion, it's clear that an anemometer is an instrument that measures wind speed and wind pressure.

• Anemometers are important tools for meteorologists, who study weather patterns.
• They are also important to the work of physicists, who study the way air moves.

Q53. Answer: (d) Fujiyama

The correct answer is Fujiyama.

Key Points

• Mount Fujiyama
• Mount Fuji is of the volcanic origin.
• In Japanese it is also called as Fuji-san and Fujiyama.
• Mount Fuji is located on Honshu Island of Japan.
• The islands of Japan from North to South are Hokkaido, Honshu, Shikoku, Kyushu and Okinawa.

Additional Information

• Appalachian Mountains
• The Appalachian Mountains, the great highland system of North America, are the eastern counterpart of the Rocky Mountains.
• Mount Mitchell is the highest point in the Appalachian Mountains. Hence option 1 is correct.
• Mount Mitchell's elevation is 2,037 meters above sea level.
• The highest elevations in the Appalachians are in the northern division.
• It extends for almost 2,000 miles from the Canadian province of Newfoundland and Labrador to central Alabama in the United States.
• The Appalachian Mountains form a natural barrier between the eastern Coastal Plain and the vast Interior Lowlands of North America.
• Ural
• The Ural Mountains are also known as the Urals or Russian Uralskie Gory.
• Ural Mountain range is spread over north to south through Russia, from the coast of the Arctic Ocean to the river Ural and northwestern Kazakhstan.
• The eastern part of this mountain is considered as the boundary between Europe and Asia.
• The mountain range stretched over 2,500 kilometers (1,550 miles).
• It passes through the Arctic tundra to the north and through forested and semi-desert landscapes to the south.
• Mount Narodnaya (6,217 feet [1,895 meters]) is the highest peak of this mountain range.
• The Urals are divided into five parts: Southern, Middle, Northern, Pre-Polar (the highest), and Polar.

Q54. Answer: (d) Ozone

The correct answer is Ozone.

Key Points

• The Kyoto Protocol
• The Kyoto Protocol operationalizes the United Nations Framework Convention on Climate Change by committing industrialized countries and economies in transition to limit and reduce greenhouse gas (GHG) emissions by agreed individual targets.
• The Kyoto Protocol implemented the objective of the UNFCCC to reduce the onset of global warming by reducing greenhouse gas concentrations in the atmosphere to "a level that would prevent dangerous anthropogenic interference with the climate system" (Article 2). The Kyoto Protocol applies to the six greenhouse gases listed in Annex A: carbon dioxide (CO_2), Methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).
• The Protocol is based on the principle of common but differentiated responsibilities:
• It acknowledges that individual countries have different capabilities in combating climate change, owing to economic development, and therefore puts the obligation to reduce current emissions on developed countries on the basis that they are historically responsible for the current levels of greenhouse gases in the atmosphere.

Q55. Answer: (d) North Central - Gorakhpur

The correct answer is North Central - Gorakhpur.

Key Points

• Gorakhpur of Uttar Pradesh is the headquarters of North-Eastern Railway Zone.
• Indian Railways is geographically organized into zones.
• In 2006 there were 13 zones on the Indian railway.
• At present, there are 18 Zonal Railways (including Metro Railway, Kolkata).
• Each zone is under the control of the General Manager (GM) who is responsible for its operation, maintenance, and financial

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position.

• GM is assisted by an Additional General Manager (AGM) and Heads of Department (HoD).

• Railway zones in India:

• | S.no. | Name of the Railway Zone | Zonal Headquarter |

01.	**Central Railway**	**Mumbai**
02.	Eastern Railway	Kolkata
03.	East Central Railway	Hajipur
04.	East Coast Railway	Bhubaneshwar
05.	Northern Railway	New Delhi
06.	North Central Railway	Allahabad
07.	North Eastern Railway	Gorakhpur
08.	North Frontier Railway	Guwahati
09.	North Western Railway	Jaipur
10.	Southern Railway	Chennai
11.	South Central Railway	Secunderabad
12.	South Eastern Railway	Kolkata
13.	South East Central Railway	Bilaspur
14.	South Western Railway	Hubli
15.	Western Railway	Churchgate
16.	West Central Railway	Jabalpur
17.	South frontier railway	Vishakhapatnam
18.	Kolkata metro	Kolkata

Q56. Answer: (a) wildlife sanctuary

The correct answer is wildlife sanctuary.

Key Points

• Wildlife Sanctuary

• A protected area where wildlife is safeguarded and preserved in their natural habitat.

• Hunting, poaching, and other disturbances are strictly prohibited.

• Primary focus is on protecting specific species or groups of animals.

• Can be smaller than national parks and often allow for some regulated human activities like tourism and research.

• Examples include Kaziranga National Park (India) for one-horned rhinoceroses and Masai Mara National Reserve (Kenya) for wildebeest migrations.

Additional Information

• Biosphere Reserve

• A large protected area divided into zones with varying levels of human activity and environmental protection.

• Core zone: Strictly protected for conservation.

• Buffer zone: Research and education activities are allowed.

• Transition zone: Sustainable human activities like agriculture and ecotourism are encouraged.

• Aim is to reconcile biodiversity conservation with sustainable use of natural resources.

• Examples include Sunderbans Biosphere Reserve (India) and Galapagos Islands Biosphere Reserve (Ecuador).

• Zoo

• A facility that houses a collection of wild animals for public display and education.

• Animals are kept in enclosures that attempt to simulate their natural habitats.

• Zoos play a role in conservation by participating in breeding programs for endangered species and conducting research.

• Ethical concerns regarding animal welfare and captivity exist.

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• Examples include San Diego Zoo (USA) and Taronga Zoo (Australia).
• National Park
• A large, relatively undisturbed area of land set aside for the protection of wildlife and natural ecosystems.
• Human activities like hunting, logging, and mining are generally prohibited.
• Focus is on preserving the entire ecosystem, including flora, fauna, and natural processes.
• Often larger than wildlife sanctuaries and offer opportunities for recreational activities like hiking, camping, and wildlife viewing.

Q57. Answer: (c) 54, 126

Given:
HCF = 18
LCM = 378
Formula used:
Product of two numbers = HCF × LCM
If two numbers are A and B:
A × B = HCF × LCM
Calculation:
A × B = 18 × 378
=> A × B = 6804
The two numbers must satisfy:
1. Their product is 6804.
2. Their HCF is 18.
3. Their LCM is 378.
Possible pairs:
Divide 6804 into factors, ensuring one common factor is 18:
=> Pair (54, 126):
HCF(54, 126) = 18
LCM(54, 126) = 378
=> Pair satisfies the conditions.
Therefore The possible pair of numbers is (54, 126).

Q58. Answer: (c) A-1, B-4, C-2, D-3

The correct answer is A-1, B-4, C-2, D-3.
Key Points
• Methane
• Simplest hydrocarbon, consisting of one carbon atom bonded to four hydrogen atoms (CH4).
• Colorless, odorless gas.
• Major component of natural gas.
• Powerful greenhouse gas, contributing to climate change.
• Produced by decomposition of organic matter in the absence of oxygen (anaerobic decomposition).
Additional Information
• Ethane
• Hydrocarbon with two carbon atoms bonded to each other and six hydrogen atoms (C2H6).
• Second member of the alkane series.
• Colorless, odorless gas.
• Component of natural gas.
• Used as a feedstock for the production of ethylene, a key building block in the petrochemical industry.
• Propane
• Hydrocarbon with three carbon atoms bonded to each other and eight hydrogen atoms (C3H8).
• Third member of the alkane series.
• Colorless, odorless gas.
• Widely used as a fuel for heating, cooking, and vehicles.
• Also used in the production of plastics and other chemicals.

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• Butane
• Hydrocarbon with four carbon atoms bonded to each other and ten hydrogen atoms (C4H10).
• Fourth member of the alkane series.
• Colorless, odorless gas.
• Used as a fuel in lighters, torches, and camping stoves.
• Also used as a propellant in aerosol cans.

Q59. Answer: (a) GRZY

The logic followed here is:
MORE is written as NRWL
Similarly,
FOUR is written as
Hence, "Option 1" is the correct answer.

Q60. Answer: (a) [figure]

The diagram that best represents the relationship between the classes given is shown below :
Lice is a type of parasites.
Parasites and deer are two different sets.
Hence, "Option 1" is the correct answer.

Q61. Answer: (c) 24

Given:
Solve the following equation:
79 + [37 - {45 - (1 - 36 ÷ 6 × 8)}] = ?
Formula Used:
Follow the BODMAS/BIDMAS rule (Brackets, Orders, Division/Multiplication, Addition/Subtraction) for solving the equation.
Calculation:
Start with the innermost brackets:
=> 36 ÷ 6 × 8
=> 6 × 8
=> 48
Now substitute back into the equation:
=> 79 + [37 - {45 - (1 - 48)}]
Simplify inside the parentheses:
=> 79 + [37 - {45 - (-47)}]
Simplify inside the curly braces:
=> 79 + [37 - (45 + 47)]
=> 79 + [37 - 92]
Simplify inside the square brackets:
=> 79 + (-55)
=> 24
The correct answer is option 3.

Q62. Answer: (a) 11.11

Given:
Cost price (CP) of 12 oranges = Selling price (SP) of 9 oranges
Discount on 10 oranges = Profit on 5 oranges
Formula used:
Profit = SP - CP
Discount = Marked Price (MP) - SP
Discount Percentage = (Discount / MP) × 100
Calculation:
From the first condition:

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SP of 1 orange = CP of 12 / 9

=> SP = (4/3) × CP

Profit on 1 orange = SP - CP

=> Profit = (4/3) × CP - CP = (1/3) × CP

Profit on 5 oranges = 5 × (1/3) × CP

=> Profit = (5/3) × CP

From the second condition:

Discount on 10 oranges = (5/3) × CP

Discount on 1 orange = (5/3) × CP / 10 = (1/6) × CP

Discount = MP - SP

MP = SP + Discount

=> MP = (4/3) × CP + (1/6) × CP

MP = (8/6) × CP + (1/6) × CP = (9/6) × CP = (3/2) × CP

Discount Percentage:

Discount Percentage = [(Discount / MP) × 100]

=> Discount Percentage = [(1/6) × CP / (3/2) × CP] × 100

=> Discount Percentage = (1/6) × (2/3) × 100

=> Discount Percentage = (2/18) × 100 = 11.11%

Therefore The discount percentage is 11.11%.

Q63. Answer: (a) Patola

Concept:

Weave:

• On a loom, a weave is created by continuously passing a single thread across two sets of lengthy strands.

• In order to create a fabric or cloth, two different sets of yarns or threads are interwoven at right angles during the weaving process.

Explanation:

Patola:

• A double ikat woven sari known as a patola is typically made of silk and is produced in Patan, Gujarat, India.

• The singular term is patola, while the plural is patola.

• They are extremely expensive and were once reserved for members of royal and aristocratic families.

• Those who can afford the high prices are drawn to these saris.

• In Surat, velvet patola fashions are also produced.

• A closely guarded family custom is patola weaving.

• These incredibly sought-after twin ikat saris are woven by three generations in Patan.

• A sari can take anywhere between six months and a year to manufacture since each strand must be individually dyed before weaving.

Thus, the traditional weave of Gujarat is known as patola.

Additional InformationTussar:

• It is rich gold-coloured silk that is produced from the larvae of specific species of Antheraea moth silkworms.

• Living in the untamed woodlands, these silkworms eat the leaves of the trees they call home.

• Tussar silk is appreciated for its plush texture and its natural, deep-gold colour.

• It is produced in various forms by several countries, including India, China, Japan, and Sri Lanka.

Kanjeevaram:

• The Kanjeevaram saree, which is regarded as one of the most beautiful in the entire world, receives its name from the hamlet of its birth, Kanchipuram.

• Another name for this lovely cloth is Kanchipuram.

• Kanjeevaram, as its name suggests, can be thought of as the South Indian equivalent of Banarasi silk sarees.

• These captivating sarees are crafted from heavy fabric and a gorgeous combination of colours.

• Kanjeevaram sarees are ideal for any occasion or celebration thanks to their touch of gold.

Jamdani:

• Jamdani is a vibrantly patterned, transparent cotton fabric that is traditionally handwoven by artisans and trainees in and around

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Dhaka.

• The completed clothing is extremely breathable because to the use of Jamdani materials, which blend intricate design with subdued or brilliant colours.

• Because of the complexity of its designs, which are made using the discontinuous weft technique directly on the loom, jamdani is a labor- and time-intensive kind of weaving.

Q64. Answer: (d) (-2, 4)

Given:

Parallelogram PQRS:

P = (-1, -1), Q = (8, 0), R = (7, 5)

Formula used:

In a parallelogram, the diagonals bisect each other. Therefore, the midpoint of diagonal PR = midpoint of diagonal QS.

Midpoint formula: Midpoint = [(x1 + x2) / 2, (y1 + y2) / 2]

Calculation:

Coordinates of midpoint of PR:

Midpoint of PR = [((-1) + 7) / 2, ((-1) + 5) / 2]

=> Midpoint of PR = [6 / 2, 4 / 2] = (3, 2)

Let the coordinates of S = (x, y).

Midpoint of QS = [(8 + x) / 2, (0 + y) / 2]

Equating midpoints of PR and QS:

(8 + x) / 2 = 3

=> 8 + x = 6

=> x = -2

(0 + y) / 2 = 2

=> y = 4

Therefore The coordinates of S are (-2, 4).

Q65. Answer: (a) Mr. Bhupesh Baghel - Jharkhand

The correct answer is Mr. Bhupesh Baghel - Jharkhand.

Key Points

• Mr. Bhupesh Baghel is actually the Chief Minister of Chhattisgarh, not Jharkhand.

• Mr. Manohar Lal Khattar is the Chief Minister of Haryana and has been serving since October 2014.

• Mr. Pinarayi Vijayan is the Chief Minister of Kerala and assumed office in May 2016.

• Mr. Pramod Sawant is the Chief Minister of Goa and has been in office since March 2019.

Additional Information

• Chief Minister of Chhattisgarh

• Mr. Bhupesh Baghel has been serving as the Chief Minister of Chhattisgarh since December 2018.

• Chhattisgarh is a state located in central India, known for its rich cultural heritage and natural resources.

• The capital of Chhattisgarh is Raipur.

• Chief Minister of Haryana

• Mr. Manohar Lal Khattar has been serving as the Chief Minister of Haryana since October 2014.

• Haryana is a state in northern India, known for its significant role in the Green Revolution in India.

• The capital of Haryana is Chandigarh, which is a union territory and also the capital of Punjab.

• Chief Minister of Kerala

• Mr. Pinarayi Vijayan has been serving as the Chief Minister of Kerala since May 2016.

• Kerala is a state in southern India, known for its high literacy rate and advanced healthcare system.

• The capital of Kerala is Thiruvananthapuram.

• Chief Minister of Goa

• Mr. Pramod Sawant has been serving as the Chief Minister of Goa since March 2019.

• Goa is a state located on the western coast of India, known for its beaches and Portuguese heritage.

• The capital of Goa is Panaji.

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Q66. Answer: (a) Odisha

The correct answer is Odisha.

Key Points

• The 'Badampahar' iron-ore mine is located in the Mayurbhanj district of Odisha, India.

• Odisha is one of the largest producers of iron ore in India, contributing significantly to the country's total output.

• The state is rich in mineral resources, with iron ore being one of the most abundant minerals found here.

• Iron ore mining in Odisha plays a crucial role in the state's economy, providing employment and contributing to the state's GDP.

Additional Information

• Iron Ore Mining in India

• India is the fourth largest producer of iron ore in the world.

• The major iron ore producing states in India are Odisha, Karnataka, Chhattisgarh, and Goa.

• Iron ore is a crucial raw material for the production of steel, which is essential for various industries such as construction, automotive, and manufacturing.

• India's iron ore exports have seen significant growth over the years, contributing to the country's foreign exchange earnings.

• Odisha's Mineral Resources

• Odisha is known for its rich mineral deposits, including iron ore, bauxite, chromite, coal, and manganese.

• The state has several major mining projects, which contribute significantly to its economy.

• Mining activities in Odisha are regulated by the state government to ensure sustainable and environmentally friendly practices.

• Odisha's mineral wealth has attracted numerous domestic and international companies to invest in the state's mining sector.

Q67. Answer: (c) India Gate

The correct answer is India Gate.

Key Points

• The 'Amar Jawan Jyoti' was installed at India Gate in New Delhi in January 1972.

• It was built to commemorate the soldiers of the Indian Armed Forces who died during the Indo-Pakistani War of 1971.

• The eternal flame serves as a national shrine and is guarded day and night by soldiers from the three services of the Indian Armed Forces.

• It consists of a black marble plinth with a reversed rifle, capped by a war helmet, bound by four urns, each with a permanent light (Jyoti) from compressed natural gas.

Additional Information

• India Gate:

• India Gate, originally called the All India War Memorial, is a war memorial located astride the Rajpath on the eastern edge of the ceremonial axis of New Delhi.

• It was designed by Sir Edwin Lutyens and commemorates the 70,000 soldiers of the British Indian Army who died in the First World War.

• The foundation stone of India Gate was laid by the Duke of Connaught in 1921, and it was inaugurated in 1931 by Lord Irwin, the then Viceroy.

• The structure is 42 meters tall and made of red and pale sandstone and granite.

• Indo-Pakistani War of 1971:

• The war was a military conflict between India and Pakistan that occurred during the Bangladesh Liberation War in East Pakistan.

• The conflict resulted in the creation of Bangladesh from East Pakistan, and it lasted just 13 days, making it one of the shortest wars in history.

• The war ended with the surrender of the Pakistani military and the establishment of Bangladesh as an independent nation on 16 December 1971.

• Amar Jawan Jyoti:

• Amar Jawan Jyoti was built in 1971 to commemorate the martyred soldiers of the Indian Armed Forces who sacrificed their lives for the country.

• It is a symbol of the bravery and sacrifice of the Indian soldiers.

• The flame is kept burning throughout the day and night as a mark of respect for the soldiers.

• On every Republic Day in India, the Prime Minister visits the Amar Jawan Jyoti to pay homage to the soldiers before participating in the Republic Day parade.

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Q68. Answer: (c) 21%

Calculation:

Step 1: Calculate the total water added

First mixing: 10% water is added.

Second mixing: 10% of the new mixture (which already contains 10% water) is added.

Step 2: Calculate the final percentage of water

After the first mixing, the mixture contains 10% water.

After the second mixing, the total water percentage is:

=> 10% + 10% of (100% + 10%)

=> 10% + 11%

=> 21%

Step 3: Calculate the profit percentage

The milkman sells the mixture at the cost price of pure milk.

Since the mixture now contains 21% water, he effectively sells 21% more "milk" (water) than he actually bought.

Profit Percentage = 21%

Therefore The milkman's profit percentage is 21%.

Q69. Answer: (b) 7

Given:

cover d = 1 ÷ 3over4

Formula used:

Division of fractions: a ÷ b = a × (1/b)

Expression: c+dover c-d

Calculation:

Step 1: Solve for cover d

cover d = 1 ÷ 3over4

=> cover d = 1 × 4over3

=> cover d = 4over3

=> c/d = 4/3

Step 2: Solve for c+dover c-d

Let c = 4k and d = 3k (where k is a constant).

=> c + d = 4k + 3k = 7k

=> c - d = 4k - 3k = k

c+dover c-d = 7k / k

=> c+dover c-d = 7

Therefore The value of c+dover c-d is 7.

Q70. Answer: (c) Mahadevi Verma

The correct answer is Mahadevi Verma.

Key Points

• Mahadevi Verma is celebrated as one of the four major poets of the Chhayavad era in Hindi literature.

• She is often referred to as the 'modern Meera' due to her deep devotion and lyrical poetry, similar to the legendary poet Meera Bai.

• Her works are known for their emotional depth, spiritual essence, and exploration of the human condition.

• Mahadevi Verma has been awarded several prestigious awards, including the Padma Bhushan and the Jnanpith Award, for her contribution to Indian literature.

Additional Information

• Mahasweta Devi

• Mahasweta Devi was an Indian Bengali writer and social activist who is known for her works on the tribal communities in India.

• Her notable works include "Hajar Churashir Maa," "Rudali," and "Aranyer Adhikar."

• She received several awards, including the Jnanpith Award, the Sahitya Akademi Award, and the Ramon Magsaysay Award.

• Mahasweta Devi's writing often highlights the struggles and resilience of marginalized communities.

• Ashapoorna Devi

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• Ashapoorna Devi was a prominent Indian novelist and poet in Bengali literature.
• She is best known for her trilogy comprising "Pratham Pratisruti," "Subarnalata," and "Bakul Katha."
• She was awarded the Jnanpith Award and the Padma Shri for her literary contributions.
• Her works often focus on the lives and struggles of women in Indian society.
• Kamala Das
• Kamala Das, also known as Kamala Surayya, was a renowned Indian English poet and Malayalam author.
• Her autobiographical work "My Story" is one of her most famous works.
• She is known for her bold and honest exploration of women's issues and sexuality in her writing.
• Kamala Das received several accolades, including the Sahitya Akademi Award and the Asian World Prize.

Q71. Answer: (a) Albuquerque, New Mexico, United States

The correct answer is Albuquerque, New Mexico, United States.

Key Points

• Microsoft Corporation was founded by Bill Gates and Paul Allen on April 4, 1975.
• It was established in Albuquerque, New Mexico, where the duo started developing software for the Altair 8800, an early personal computer.
• Microsoft is known for its Windows operating system and Office suite of productivity software.
• Since its founding, Microsoft has grown to become one of the largest and most influential technology companies in the world.

Additional Information

• Bill Gates:
• Bill Gates is an American business magnate, software developer, and philanthropist.
• He co-founded Microsoft Corporation with Paul Allen in 1975.
• Gates was the company's CEO until 2000 and has been involved in various philanthropic efforts through the Bill & Melinda Gates Foundation.
• Paul Allen:
• Paul Allen was an American business magnate, researcher, investor, and philanthropist.
• He co-founded Microsoft Corporation with Bill Gates.
• Allen also founded Vulcan Inc. and owned the Seattle Seahawks and Portland Trail Blazers.
• Altair 8800:
• The Altair 8800 is a microcomputer designed in 1974 by MITS (Micro Instrumentation and Telemetry Systems).
• It was based on the Intel 8080 CPU and is considered one of the first successful personal computers.
• Bill Gates and Paul Allen developed a version of the BASIC programming language for the Altair, which led to the founding of Microsoft.
• Windows Operating System:
• Microsoft Windows is a group of several proprietary graphical operating system families, all developed and marketed by Microsoft.
• Each family caters to a certain sector of the computing industry.
• Windows is the most widely used operating system for personal computers.

Q72. Answer: (c) the United States of America

The correct answer is the United States of America.

Key Points

• The Pittsburgh industrial region is a significant industrial and manufacturing hub located in the northeastern United States.
• Pittsburgh, known as the "Steel City," played a major role in the steel industry during the 19th and 20th centuries.
• The region is located in the state of Pennsylvania and has a rich history tied to coal mining, steel production, and manufacturing.
• Today, Pittsburgh has diversified its economy, with a strong presence in technology, healthcare, education, and finance sectors.

Additional Information

• Industrial Regions
• Industrial regions are areas where a high concentration of industries exists, often due to favorable geographic, economic, and social factors.
• These regions typically have well-developed infrastructure, including transportation networks, power supply, and communication facilities.
• Industrial regions contribute significantly to a country's economy by providing employment, generating income, and facilitating

trade.

• Some other notable industrial regions include the Ruhr Valley in Germany, the Midlands in the UK, and the Kanto region in Japan.

• Pittsburgh's Transformation

• Pittsburgh's economy transitioned from heavy industry to a more diverse economy focused on technology, education, and healthcare.

• The city is home to several prestigious universities, including the University of Pittsburgh and Carnegie Mellon University, which contribute to research and innovation.

• Pittsburgh has attracted numerous technology companies and startups, making it a growing tech hub in the United States.

• The healthcare sector, with major institutions like the University of Pittsburgh Medical Center (UPMC), also plays a vital role in the region's economy.

• Historical Importance of Steel

• The steel industry was the backbone of Pittsburgh's economy during the late 19th and early 20th centuries.

• Andrew Carnegie, a prominent industrialist, established the Carnegie Steel Company in Pittsburgh, which later became part of U.S. Steel Corporation.

• The city's strategic location near coal and iron ore deposits contributed to its growth as a steel manufacturing hub.

• Though the steel industry declined in the latter half of the 20th century, it left a lasting legacy on Pittsburgh's industrial landscape.

Q73. Answer: (b) West

Given:

During his morning walk, Vidhyanshu faced towards the sun and walked a few kilometres.

After some time, he turned to his right and walked 5 km.

Then, he again turned to his right and continued walking.

As the sun rises in the east, so Vidhyanshu faced towards the east at the starting.

Thus, Vidhyanshu was moving in the west direction.

Hence, "Option 2" is the correct answer.

Q74. Answer: (a) 2over3

Given:

Expression: √[5]32/243

Formula used:

√[n]a/b = ((n√a))/((n√b))

Calculation:

5√32 = 2 (since 32 = 2^5)

5√243 = 3 (since 243 = 3^5)

=> √[5]32/243 = 2 over 3

Therefore The value of √[5]32/243 is 2 over 3

Q75. Answer: (c) Pole Star

The correct answer is Pole Star.

Key Points

• The Pole Star, also known as Polaris, is not part of our solar system. It is a distant star in the Milky Way galaxy.

• Europa is one of Jupiter's moons, and it is part of our solar system.

• The Moon is Earth's only natural satellite and is part of our solar system.

• The Sun is the star at the center of our solar system and the most important source of energy for life on Earth.

Additional Information

• Solar System:

• The Solar System consists of the Sun and all the objects that are gravitationally bound to it, including the eight planets and their moons, dwarf planets, and other small bodies like asteroids and comets.

• Planets in our solar system include Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

• Moons are natural satellites that orbit planets; notable moons include Earth's Moon, Jupiter's Europa, and Saturn's Titan.

• The Sun is a G-type main-sequence star (G2V) that contains more than 99.8% of the total mass of the solar system.

• Pole Star (Polaris):

• Polaris, also known as the North Star, is the brightest star in the constellation Ursa Minor.

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• It is almost directly aligned with the Earth's rotational axis, making it an excellent fixed point for celestial navigation.
• Polaris is approximately 433 light-years away from Earth.
• It is a supergiant star, classified as a Cepheid variable, meaning its brightness varies over a regular period.
• Europa:
• Europa is one of the largest moons of Jupiter and is the sixth-closest moon to the planet.
• It has a smooth, icy surface and is considered one of the most likely places to find extraterrestrial life due to the potential subsurface ocean beneath its ice crust.
• Europa was discovered by Galileo Galilei in 1610.
• Moon:
• The Moon is the Earth's only natural satellite and is the fifth-largest satellite in the solar system.
• It is about 384,400 km away from Earth and has a diameter of 3,474 km.
• The Moon's gravitational influence is responsible for the Earth's tides.

Q76. Answer: (a) Central Asia

The correct answer is Central Asia.

Key Points

• The Mongols were a nomadic tribe that originated from the Central Asian steppes.
• Their homeland was primarily in the region of modern-day Mongolia and parts of China, Russia, and Kazakhstan.
• Under the leadership of Genghis Khan, the Mongols created the largest contiguous empire in history.
• The Mongol Empire facilitated trade and cultural exchange across Eurasia, significantly impacting the regions they conquered.

Additional Information

• Pastoral Nomadism
• Pastoral nomadism is a form of subsistence agriculture where people rely on domesticated livestock.
• Nomads move their herds between pastures seasonally, often over vast distances.
• This lifestyle requires knowledge of animal husbandry and the ability to adapt to different environments.
• Pastoral nomads have played significant roles in history, including the spread of cultures, languages, and technologies.
• Hunter-Gatherers
• Hunter-gatherers are people who obtain their food by hunting, fishing, and gathering wild plants.
• This way of life was prevalent before the advent of agriculture and sedentary societies.
• Hunter-gatherer societies are typically nomadic and have a deep knowledge of their natural environment.
• These societies are often characterized by small, mobile groups with egalitarian social structures.
• Mongol Empire
• The Mongol Empire was founded by Genghis Khan in the early 13th century.
• It became the largest contiguous land empire in history, stretching from Europe to Asia.
• The Mongols were known for their military prowess, horseback riding skills, and innovative tactics.
• Despite their reputation for brutality, the Mongol rule also brought about a period of relative peace and stability known as the Pax Mongolica.
• Genghis Khan
• Genghis Khan, born as Temujin, was the founder and first Great Khan of the Mongol Empire.
• He unified the Mongol tribes and initiated a series of military campaigns that expanded the empire.
• Genghis Khan's leadership and strategic genius were pivotal in the Mongols' success.
• His legacy is complex, marked by both the devastation his conquests caused and the cultural and economic exchanges they facilitated.

Q77. Answer: (a) 356

The logic followed here is:

Option 1) 356 → No a perfect square

Option 2) 144 → Prefect square of 12

Option 3) 169 → Prefect square of 13

Option 4) 289 → Prefect square of 17

Thus, out of all the options, '356' is the odd one out.

Hence, "Option 1" is the correct answer.

Q78. Answer: (c) [figure]

The diagram that best represents the relationship between the classes given is shown below :

Rivers and Lakes are two different types of Water bodies.

Mountains and Water bodies are two different sets.

Hence, "Option 3" is the correct answer.

Q79. Answer: (a) Repairs

The logic followed here is:

Logic: A worker is associated with the primary function they perform.

Here,

Mason : Builds → Mason is a worker who builds.

Similarly,

Mechanic : Repairs → Mechanic is a worker who repairs.

Hence, the correct answer is "Option 1".

Q80. Answer: (d) -2

Given:

$a + b + c = 5$

$a^2 + b^2 + c^2 = 29$

Formula Used:

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

Calculation:

First, we start with the given formula:

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

Substitute the given values:

$5^2 = 29 + 2(ab + bc + ca)$

$\Rightarrow 25 = 29 + 2(ab + bc + ca)$

Subtract 29 from both sides:

$\Rightarrow 25 - 29 = 2(ab + bc + ca)$

$\Rightarrow -4 = 2(ab + bc + ca)$

Divide both sides by 2:

$\Rightarrow -4 / 2 = ab + bc + ca$

$\Rightarrow ab + bc + ca = -2$

The value of $ab + bc + ca$ is -2.

Q81. Answer: (c) Amazonia-1

The correct answer is Amazonia-1.

Key Points

• Amazonia-1 is the first Earth observation satellite entirely developed by Brazil's National Institute for Space Research (INPE).

• Amazonia-1 was launched aboard the PSLV-C51 (Polar Satellite Launch Vehicle) on 28 February 2021.

• The satellite is designed for monitoring deforestation in the Amazon region and for agricultural and environmental monitoring across Brazil.

• This mission marked a significant milestone in Brazil's space program, being the first fully Brazilian-designed, assembled, and tested satellite to be launched into space.

Additional Information

• PSLV (Polar Satellite Launch Vehicle)

• The PSLV is an expendable launch system developed and operated by the Indian Space Research Organisation (ISRO).

• It is known for its high reliability and versatility, capable of launching multiple satellites into different orbits in a single mission.

• PSLV has been instrumental in launching numerous satellites for various countries, making it a preferred launch vehicle for international satellite launches.

• The PSLV-C51 mission marked the 53rd flight of the PSLV, demonstrating ISRO's continued excellence in space launch capabilities.

• Earth Observation Satellites (EOS)

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• These satellites are designed to monitor and collect data on the Earth's physical, chemical, and biological systems.

• They are used for various applications, including environmental monitoring, meteorology, mapping, and disaster management.

• EOS play a crucial role in understanding climate change, managing natural resources, and supporting sustainable development initiatives.

• INPE (National Institute for Space Research)

• INPE is Brazil's leading institution in the field of space science and technology.

• It focuses on research and development in space activities, including satellite development, space missions, and remote sensing applications.

• INPE plays a critical role in advancing Brazil's capabilities in space technology and contributing to global space research efforts.

Q82. Answer: (a) Robert Clive

The correct answer is Robert Clive.

Key Points

• Robert Clive, also known as Clive of India, was a British officer and soldier who established the military and political supremacy of the East India Company in Bengal.

• The Battle of Plassey was fought on June 23, 1757, between the forces of Siraj-ud-Daulah, the last independent Nawab of Bengal, and the British East India Company.

• Robert Clive led the Company's forces to a decisive victory against Siraj-ud-Daulah, which marked the beginning of British colonial rule in India.

• The victory at Plassey was achieved through strategic alliances and the defection of key commanders in Siraj-ud-Daulah's army to the British side.

Additional Information

• East India Company:

• The British East India Company was a private company granted a trade monopoly with the East Indies by Queen Elizabeth I.

• It eventually became involved in politics and acted as an agent of British imperialism in India from the early 18th century to the mid-19th century.

• The company's success in wars and its control over trade routes allowed it to gain significant territory and influence in India.

• Battle of Plassey:

• The Battle of Plassey was a decisive victory of the British East India Company over the Nawab of Bengal and his French allies.

• The battle took place on June 23, 1757, on the banks of the Bhagirathi River, near Plassey in Bengal.

• This battle paved the way for the British to establish a strong foothold in India and later expand their rule over the entire subcontinent.

• Siraj-ud-Daulah:

• Siraj-ud-Daulah was the last independent Nawab of Bengal, Bihar, and Orissa.

• His defeat at the Battle of Plassey marked the end of independent rule in Bengal and the beginning of British dominance in India.

• His reign was marked by conflicts with the British East India Company, which ultimately led to his downfall.

In the source code, the correct answer "Robert Clive" is highlighted, and key points about him and the Battle of Plassey are provided. Additional information about the East India Company, the Battle of Plassey, and Siraj-ud-Daulah is also included to give a comprehensive understanding of the context.

Q83. Answer: (d) 9

Given:

$x = 3 \cos A \cos B$

$y = 3 \cos A \sin B$

$z = 3 \sin A$

Formula Used:

$x^2 + y^2 + z^2$

Calculation:

$x^2 = (3 \cos A \cos B)^2$

$x^2 = 9 \cos^2 A \cos^2 B$

$y^2 = (3 \cos A \sin B)^2$

$y^2 = 9 \cos^2 A \sin^2 B$

$z^2 = (3 \sin A)^2$

$z^2 = 9 \sin^2 A$

$x^2 + y^2 + z^2 = 9 \cos^2 A \cos^2 B + 9 \cos^2 A \sin^2 B + 9 \sin^2 A$

$\Rightarrow 9 (\cos^2 A \cos^2 B + \cos^2 A \sin^2 B + \sin^2 A)$

$\Rightarrow 9 [\cos^2 A (\cos^2 B + \sin^2 B) + \sin^2 A]$

$\Rightarrow 9 (\cos^2 A \times 1 + \sin^2 A)$

$\Rightarrow 9 (\cos^2 A + \sin^2 A)$

$\Rightarrow 9 \times 1$

$\Rightarrow 9$

The correct answer is option 4.

Q84. Answer: (a) 17over4

Given:

$2 (\cos + \sec) = 5$

Formula used:

$\sec = 1 / \cos$

$\sec^2 - \cos^2 = 1$

Calculation:

Step 1: Simplify the given equation

$2 (\cos + \sec) = 5$

$\Rightarrow \cos + \sec = 5 / 2$

$\Rightarrow \cos + (1 / \cos) = 5 / 2$

$\Rightarrow (\cos^2 + 1) / \cos = 5 / 2$

$\Rightarrow \cos^2 + 1 = (5 / 2) \times \cos$

Step 2: Solve for $\cos^2$

Let $\cos = x$:

$x^2 + 1 = (5 / 2) \times x$

$\Rightarrow 2x^2 - 5x + 2 = 0$

Factorize:

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

$\Rightarrow x = 1/2$ or $x = 2$

Since cos must be ≤ 1, $x = 1/2$.

$\cos = 1/2$

$\sec = 1 / (1/2) = 2$

Step 3: Solve for $\sec^2 + \cos^2$

$\sec^2 = 2^2 = 4$

$\cos^2 = (1/2)^2 = 1/4$

$\sec^2 + \cos^2 = 4 + 1/4$

$\Rightarrow \sec^2 + \cos^2 = 17/4$

Therefore The value of $\sec^2 + \cos^2$ is 17/4.

Q85. Answer: (b) • 5/7

Given:

Rational number: -40/56

Formula used:

To express the rational number as an equivalent fraction with a numerator of -5, divide both numerator and denominator by a common factor such that the numerator becomes -5.

Calculation:

$-40/56 = (-40 \div 8) / (56 \div 8)$

$\Rightarrow -40/56 = -5/7$

Therefore The equivalent rational number is -5/7.

Q86. Answer: (a) The ratio of the rate of higher level employment to the total employment rate was the same in 1995 and 2010.

Calculation:

Option 1:
The rate of higher level employment to the total employment rate in 1995 is 15 : 42
The rate of higher level employment to the total employment rate in 2010 is 15 : 55
Which is not same.
Hence Option 1 is not true.
Option 2:
The highest rate of secondary level employment was in 2010, which is equal to 25%.
Hence option 2 is true.
Option 3:
The lowest rate of primary level employment was in 1995, which is equal to 15%
Hence option 3 is true.
Option 4:
The lowest rate of higher level employment was in 2005, which is equal to 10%
Hence option 4 is true.
The correct answer is option 1.

Q87. Answer: (c) English

Calculation:
Improvement in each subject:
English: 67 - 65 = 2
Hindi: 68 - 70 = -2 (no improvement, marks decreased)
Mathematics: 94 - 88 = 6
Science: 85 - 82 = 3
Social science: 75 - 71 = 4
The least improvement occurred in English
Therefore The student improved the least in English.

Q88. Answer: (d) 16 Lakhs

Given:
Total expenditure = Rs. 50 lakhs
Maintenance charges = 58°
Security = 55°
Total angle of the circle = 360°
Formula used:
Expenditure for a category = (Category angle / Total angle) × Total expenditure
Calculation:
Combined angle for maintenance charges and security = 58° + 55° = 113°
Expenditure on maintenance charges and security = (113 / 360) × Rs. 50 lakhs
=> Expenditure = (113 × 50) / 360
=> Expenditure = Rs. 15.69 lakhs (approximately)
Therefore The total amount spent on maintenance charges and security together is approximately Rs. 16 lakhs.

Q89. Answer: (a) T

Calculation:
Change in imported units from 2017 to 2018 of device T = 26 - 20 = 6 (Lakhs)
Change in imported units from 2017 to 2018 of device P = 30 - 25 = 5 (Lakhs)
Change in imported units from 2017 to 2018 of device R = 30 - 28 = 2 (Lakhs)
Change in imported units from 2017 to 2018 of device s = 36 - 34 = 2 (Lakhs)
Maximum changes occurred in device T.
The correct answer is option 1.

Q90. Answer: (d) E

The logic followed here is:

Hence, "Option 4" is the correct answer.

Q91. Answer: (c) WC

The logic followed here is:

Option 1) ZE

Option 2) JO

Option 3) WC

Option 4) NS

Thus, out of all the options, 'WC' is the odd one out.

Hence, "Option 3" is the correct answer.

Q92. Answer: (c) 76

The logic followed here is:

A is written as 1

And,

AIR is written as 28

Similarly,

AIRCRAFT is written as

Hence, "Option 3" is the correct answer.

Q93. Answer: (a) CPOSUX

The logic followed here is:

FEATURE is written as HICXWVG

Similarly,

ALMOST is written as

Hence, "Option 1" is the correct answer.

Q94. Answer: (d) B is the effect and A is its immediate and principal cause.

Given Statement:

Event A: Philips joined a gym recently.

Event B: Philips has been looking a lot fitter now.

Here,

Event A is the cause, it would mean that because Philips joined a gym recently, he has been looking fitter now. This is a logical conclusion as gym workouts are often a direct cause of improved fitness.

Event B is the effect, it would mean that Philips's improved fitness is a result of joining the gym. This supports a direct cause-and-effect relationship between the two events.

Therefore, B is the effect and A is its immediate and principal cause.

Hence, the correct answer is "Option 4".

Q95. Answer: (c) N

The logic followed here is:

Hence, "Option 3" is the correct answer.

Q96. Answer: (b) 857

The logic followed here is:

Hence, "Option 2" is the correct answer.

Q97. Answer: (a) 3

The logic followed here is :-

From the given three different dices the adjacent sides are as shown below :

As 3 is common on both the dice I and III, it is clear that 4, 5, 1, and 6 are adjacent to it, and the remaining i.e. 2 will be opposite to it.

Opposite pairs:

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4 → 6
5 → 1
3 → 2
So, the opposite side of "2" will be side "3".
Hence, the correct answer is "Option 1".

Q98. Answer: (d) 3

The logic followed here is:
6 + 8 + 7 + 3 = 8 × 3
24 = 24 (LHS = RHS)
And,
9 + 8 + 8 + 7 = 16 × 2
32 = 32 (LHS = RHS)
Similarly,
5 + 3 + 2 + 2 = ? × 4
12 ÷ 4 = ?
3 = ?
Hence, "Option 4" is the correct answer.

Q99. Answer: (c) 64

The logic followed here is:
4 + 3 = √49
7 = 7 (LHS = RHS)
And,
2 + 4 = √36
6 = 6 (LHS = RHS)
Similarly,
5 + 3 = √?
8^2 = ?
64 = ?
Hence, "Option 3" is the correct answer.

Q100. Answer: (c) Pankaj

Given: Basis of the top five students' result analysis.
1) A class teacher found that Lokesh and Sumit are good in Insurance and Banking.
2) Arun and Lokesh are good in Accounts and Banking.
3) Arun, Pankaj and Surendra are good in Economics and Accounts

Students	**Subjects**			
	Insurance	Banking	Economics	Accounts
Lokesh	Yes	Yes		Yes
Sumit	Yes	Yes		
Arun		Yes	Yes	Yes
Pankaj			Yes	Yes
Surendra			Yes	Yes

4) Surendra and Arun are good in Geography and Accounts
5) Pankaj and Sumit are good in Economics and Insurance.

Students	**Subjects**				
	Insurance	Banking	Economics	Accounts	Geography
Lokesh	Yes	Yes		Yes	

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Sumit	Yes	Yes	Yes		
Arun		Yes	Yes	Yes	Yes
Pankaj	Yes		Yes	Yes	
Surendra			Yes	Yes	Yes

Thus, Pankaj is good in Insurance, Accounts and Economics.

Hence, "Option 3" is the correct answer.

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