STAFF SELECTION COMMISSION

COMBINED GRADUATE LEVEL (TIER-I)

SOLVED PAPER

(11th April 2022: Shift-1)

Time Allotted: 1 hour **Max marks:** 200

General Intelligence and Reasoning

1. In a certain language, CHHAPAK is coded as DJKEUGR. How will MALANGA be coded in that language?
1. NCEOSMC **2.** NCOCSMC
3. NCOESMH **4.** NCOCMSC

2. Amit, Gaurav, Hatim, Varun, Yukti and Zaid are sitting in a straight line, all facing the north. Gaurav is fourth to the left of Amit. Yukti is sitting at one corner. Hatim is fourth to the left of Yukti. Zaid is third to the right of Gaurav. Who is sitting at the second place to the left of Zaid?
1. Varun **2.** Yukti **3.** Hatim **4.** Amit

3. Select the correct combination of mathematical signs that can sequentially replace the * signs and balance the given equation.
60 * 48 * 36 * 6 * 15 * 53
1. +, ÷, –, ×, = **2.** +, ÷, ×, –, = **3.** ÷, +, ×, –, = **4.** ×, ÷, +, –, =

4. Select the number from the given options that can replace the question mark (?) in the following series.
237, 196, 155, 114, ?
1. 47 **2.** 98 **3.** 73 **4.** 64

5. Select the combination of letters that when sequentially placed in the blanks of the given series will complete the series.
_ Z _ C _ L Z _ C _ L _ X _ V L _ _ _ V
1. L, X, V, X, V, Z, C, Z, X, C **2.** X, Z, L, X, V, Z, C, C, C, L
3. L, X, C, X, V, C, Z, C, Z, C **4.** L, X, V, V, X, C, C, X, Z, Z

6. If '@' means 'addition', '%' means ,multiplication', '$' means 'division' and '#' means 'subtraction', then find the value of the given expression.
29 @ 128 $ 16 % 7 # 22
1. 58 **2.** 47 **3.** 63 **4.** 23

7. Select the option in which the given figure is embedded (rotation is NOT allowed).

1.  **2.**  **3.**  **4.** 

8. The sequence of folding a piece of paper and the manner in which the folded paper has been cut is shown in the following figures. How would this paper look when unfolded?

1.  **2.**  **3.**  **4.** 

9. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.
Statements:
All flowers are beautiful.
Vaidehi is beautiful.
Conclusions:
I. Vaidehi is a flower.
II. Some beautiful are flowers.
1. Only conclusion II follows.
2. Either conclusion I or II follows.
3. Only conclusion I follows.
4. Both the conclusions follow.

10. Select the correct water image of the given combination of letters.
D F N Z S R
1. ꓷ ꓞ ᴎ Z S ꓤ **2.** ꓷ ꓱ Z ᴎ S ꓤ
3. ꓷ ꓱ ᴎ Z S ꓤ **4.** ꓷ ꓱ ᴎ Z S ꓤ

11. Select the correct option that indicates the the correct order of the given words as they would appear in an English dictionary.
1. petitionary **2.** petitioning
3. petition **4.** petitioners **5.** petitioned
1. 1, 2, 3, 4, 5 **2.** 4, 1, 2, 3, 5 **3.** 3, 1, 5, 4, 2 **4.** 3, 1, 4, 5, 2

12. Select the option that is related to the third term in the same way as the second term is related to the first term.
BACTERIA : EXFWBUFX :: WOUNDS : ?
1. ZLRQGV **2.** YLRQFV **3.** ZLSQFW **4.** ZRXQGV

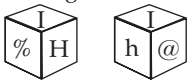
13. Study the given pattern carefully and select the number from the given options that can replace the question mark (?) in it.
48 63 56
42 18 8 45 15 21 51 ? 8
14 9 17
1. 21 **2.** 18 **3.** 19 **4.** 17

14. Select the letter-cluster from the given options that can replace the question mark (?) in the following series.
TSF, RPJ, PMN, NJR, ?
1. JFV **2.** KGU **3.** LGN **4.** LGV

15. In a certain code language, 'CROWD' is coded as 23415924 and 'TRHICK' is coded as 162491997. How will 'FRUGAL' be coded in that language?
1. 1226761821 **2.** 15210122991 **3.** 1512021921 **4.** 1221021186

16. Saloni is the daughter of the only son of Kartik. Nirupama is the mother of Deepak. Yamini's only son, Ankit, is married to Nirupama. Kartik is the paternal grandfather of Deepak. How is Kartik related to Ankit?
1. Brother **2.** Paternal uncle
3. Son **4.** Father

17. Six letters and symbols, H, h, I, @, % and S, are written on the different faces of a dice. Two positions of this dice are shown. Select the letter or symbol that will be on the face opposite to the one having 'H'.

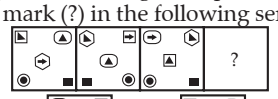


1 $ **2.** % **3.** h **4.** @

18. Select the option that is related to the third number in the same way as the second number is related to the first number.
223 : 350 :: 519 : ?
1. 736 **2.** 645 **3.** 687 **4.** 654

19. Four letter-clusters have been given, out of which three are alike in some manner and one is different. Select the letter-cluster that is different.
1. SPK **2.** JGT **3.** PMN **4.** GTQ

20. Select the figure from the given options that can replace the question mark (?) in the following series.



1.  **2.**  **3.**  **4.** 

21. In a certain code language, 6,219 means 'Sachin is a cricketer' and 2,646 means 'He played from Mumbai'. Which of the following is the code for 'Mumbai is very famous'?
1. 7,945 **2.** 6,246 **3.** 6,285 **4.** 2,458

22. Select the set of classes of relationship among which is best illustrated by the following Venn diagram.

1. Fathers, Brothers, Males
2. Grandfathers, Fathers, Males
3. Literates, Engineers, Farmers
4. Mothers, Aunt, Doctors

23. Gaurav exits from the backdoor of his north-facing house and walks 25 m straight, then he takes a left turn and walks 36 m, then he turns left and walks 47 m. He turns left again and walks 36 m. How far and in which direction is he from his house now?
1. 22 m, North **2.** 11 m, North
3. 22 m, South **4.** 11 m, South

24. Mohit and Sudesh bought pens and notebooks from the same shop. Mohit bought 3 pens and 6 notebooks by paying an amount of ₹180. Sudesh bought 5 pens and 2 notebooks by paying an amount of ₹116. How much did Mohit spend on buying notebooks?
1. ₹84 **2.** ₹138 **3.** ₹122 **4.** ₹115

25. Select the number from among the given options that can replace the question mark (?) in the following series.
5, 18, 70, 278, ?
1. 328 **2.** 298 **3.** 1,110 **4.** 592

General Awareness

26. On which of the following options does the numerical taxonomy of plants is based?
1. All observable characteristics
2. Chemical constituents
3. Structure **4.** Chromosome number

27. On which day was the National Emblem of India adopted?
1. 15th August, 1952 **2.** 26th January, 1950
3. 15th August, 1947 **4.** 26th January, 1959

28. Who among the following became the Chief Minister of Uttarakhand in March, 2021?
1. Madan Kaushik **2.** Tirath Singh Rawat
3. BC Khanduri **4.** Dhan Singh Rawat

29. The allocation towards health and well-being was increased by _____ over the previous year in Union Budget 2021–22.
1. 125% **2.** 100% **3.** 140% **4.** 137%

30. Who among the following is the author of the book 'The Secret of the Veda'?
1. Sri Aurobindo **2.** Annie Besant
3. Swami Vivekananda **4.** J Krishnamurti

31. Pneumatophores are specialised _____ in hydrophytes.
1. seeds **2.** roots **3.** fruits **4.** flowers

32. Which of the following days is celebrated as 'World Water Day'?
1. 22 March **2.** 29 March **3.** 18 February **4.** 5 April

33. Who among the following Rajput rulers defeated Muhammad Ghori in the First Battle of Tarain in 1191 AD?
1. Rana Kumbha **2.** Maldeo Rathore
3. Prithviraj Chauhan **4.** Bappa Rawal

34. In which year was the 'Lotteries Regulation Act' passed?
1. 1998 **2.** 1993 **3.** 1999 **4.** 1991

35. A Ghatam is a _____ .
1. large, narrow-mouthed earthenware pot used as a percussion instrument
2. small handheld drum that resembles a tambourine
3. wind instrument made of wood and metal
4. percussion instrument made of leather and jackwood

36. Which of the following is an Indirect Tax in India?
1. Goods and Services Tax **2.** Income Tax
3. Corporation Tax **4.** Capital Gains Tax

37. Tribes of the Nicobar Islands pay their respects to the departed soul of the head of the family during the _____ .
1. Ossuary Feast **2.** Jagaddhatri Puja
3. Ganjan Festival **4.** Kalpataru Utsav

38. Which of the following statements is/are correct?
I. Only marketed goods are considered while estimating Gross Domestic Product (GDP).
II. The work done by a woman at her home is outside the purview of Gross Domestic Product.
III. In estimating GDP, only final goods and services are considered.
1. Only II and III **2.** I, II and III
3. Only I and III **4.** Only II

39. _____ was an important port city in ancient India.
1. Tamralipti **2.** Shravasti **3.** Ahichhatra **4.** Champa

40. _____ is reducing the degree or intensity of, or eliminating, pollution.
1. Abatement **2.** Aerosol **3.** Absorption **4.** Aeration

41. Which of the following teams won the Indian Super League 2020–21 ?
1. Kerala Blasters FC **2.** NorthEast United FC
3. ATK Mohun Bagan **4.** Mumbai City FC

42. The former Spanish footballer, Antonio Lopez Habas, was the coach at the Hero ISL 2020-21 of which of the following football teams?
1. ATK Mohun Bagan **2.** Kerala Blasters
3. FC Goa **4.** SC East Bengal

43. Which of the following is also known as the 'White Mountain'?
1. Cho Oyu **2.** Makalu
3. Dhaulagiri I **4.** Lhotse

44. With which of the following oceans would you associate the 'Ring of Fire'?
1. Arctic **2.** Atlantic **3.** Indian **4.** Pacific

45. Which of the following Amendments of the Constitution of India added a new fundamental duty under Article 51-A?
1. Eighty-fifth Amendment Act, 2001
2. Eighty-sixth Amendment Act, 2002
3. Eighty-eighth Amendment Act, 2003
4. Eighty-seventh Amendment Act, 2003

46. The theme for International Mother Earth Day, 2021 was '_____'.
1. Restore our Earth **2.** Protect our Species
3. Climate Action **4.** End Plastic Pollution

47. In which of the following states/union territories was an election **NOT** held during March-April 2021?
1. Puducherry **2.** West Bengal
3. Bihar **4.** Tamil Nadu

48. The British East India Company captured Pondicherry (Puducherry) from the French in the year _____ .
1. 1761 **2.** 1699 **3.** 1674 **4.** 1738

49. According to Ramsar Convention, Which day is celebrated as World Wetlands Day?
1. 18th March **2.** 15th January
3. 2nd February **4.** 19th December

50. At least _____ of the carbon dioxide fixation on earth is carried out by algae through photosynthesis.
1. a quarter **2.** a half **3.** one-tenth **4.** one-third

Quantitative Aptitude

51. A sold a mobile phone to B at a gain of 25% and B sold it to C at a loss of 10%. If C paid ₹5,625 for it, how much did A pay (in ₹) for the phone?
1. 5,000 **2.** 4,800 **3.** 4,500 **4.** 5,100

52. The value of $\dfrac{\sin 23^\circ \cos 67^\circ + \sec 52^\circ \sin 38^\circ + \cos 23^\circ \sin 67^\circ + \operatorname{cosec} 52^\circ \cos 38^\circ}{\operatorname{cosec}^2 20^\circ - \tan^2 70^\circ}$ is:
1. 3 **2.** 4 **3.** 2 **4.** 0

53. A motorboat whose speed is 20 km/h in still water takes 30 minutes more to go 24 km upstream than to cover the same distance downstream. If the speed of the boat in still water is increased by 2 km/h, then how much time will it take to go 39 km downstream and 30 km upstream?
1. 2 h 40 minutes **2.** 3 h 10 minutes
3. 3 h 40 minutes **4.** 2 h 50 minutes

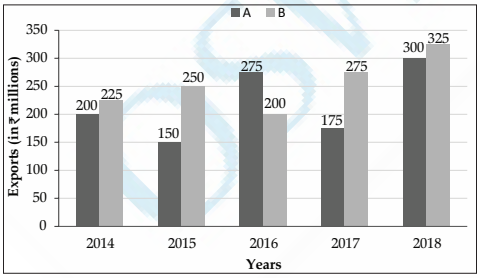
54. AB is a diameter of a circle with centre O. A tangent is drawn at point A. C is a point on the circle such that BC produced meets the tangent at P. If ∠APC = 62° then find the measure of the minor arc AC.
1. 56° **2.** 62° **3.** 28° **4.** 31°

55. A can finish a piece of work in 16 days and B can finish it in 12 days. They worked together for 4 days and then A left. B finished the remaining work. For how many total number of days did B works to finish the work completely?
1. 6 **2.** 9 **3.** 4 **4.** 8

56 A solid cube of side 8 cm is dropped into a rectangular container of length 16 cm, breadth 8 cm and height 15 cm which is partly filled with water. If the cube is completely submerged, then the rise of water level (in cm) is:
1. 2 **2.** 6 **3.** 5 **4.** 4

57. If $(x + 6y) = 8$, and $xy = 2$, where $x > 0$, what is the value of $(x^3 + 216y^3)$?
1. 288 **2.** 224 **3.** 368 **4.** 476

58. The following bar graph shows exports of cars of type A and B (in ₹millions) from 2014 to 2018.



What is the ratio of the total exports of cars of type A in 2014 and 2017 to the total exports of cars of type B in 2015 and 2016?
1. 10 : 9 **2.** 5 : 6 **3.** 11 : 10 **4.** 3 : 2

59. In a ΔABC, points P, Q and R are taken on AB, BC and CA, respectively, such that BQ = PQ and QC = QR. If ∠BAC = 75°, what is the measure of ∠PQR (in degrees)?
1. 40 **2.** 30 **3.** 50 **4.** 75

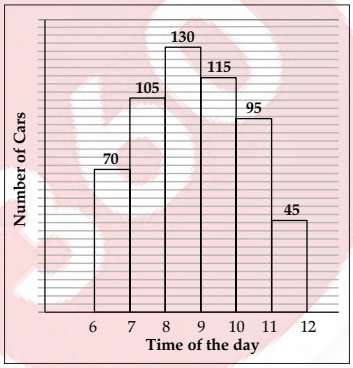
60. If $4\sin^2\theta = 3(1 + \cos\theta)$, $0° < \theta < 90°$, then what is the value of $(2\tan\theta + 4\sin\theta - \sec\theta)$?
1. $3\sqrt{15} - 4$ **2.** $15\sqrt{3} - 4$ **3.** $15\sqrt{3} + 3$ **4.** $4\sqrt{15} - 3$

61. The lengths of the three sides of a right-angled triangle are $(x - 1)$ cm, $(x - 1)$ cm and $(x + 3)$ cm, respectively. The hypotenuse of the right-angled triangle (in cm) is:
1. 6 **2.** 10 **3.** 12 **4.** 7

62. A certain sum is deposited for 4 years at a rate of 10% per annum on compound interest compounded annually. The difference between the interest at the end of 2 years and that at the end of 4 years is ₹5,082. Find the sum (in ₹).
1. 20,000 **2.** 25,500 **3.** 50,820 **4.** 10,164

63. An item costs ₹400. During a festival sale, a company offers a sale discount that offers x% off on its regular price along with a discount coupon of 10%. The price of the item after using both the sale discount and the discount coupon, is ₹216, What is the value of x?
1. 25 **2.** 40 **3.** 30 **4.** 35

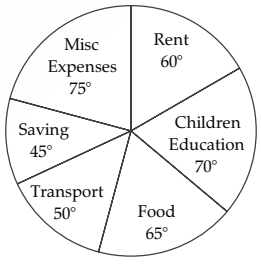
64. The number of cars passing the road near a colony from 6 am to 12 noon has been shown in the following histogram. What is the ratio of the number of cars passed between 6 am and 8 am to the number of cars passed between 9 am and 11 am?



1. 5 : 6 **2.** 7 : 4 **3.** 21 : 19 **4.** 14 : 23

65. The monthly expenditure of a family on different heads is shown in the following pie chart.
The amount spent on Children's Education, Transport and Rent is what percentage of the total earnings?

Expenditure on different Heads



1. 45% **2.** 55% **3.** 40% **4.** 50%

66. Find the greatest number 23a68b, which is divisible by 3 but NOT divisible by 9.
1. 238689 **2.** 239685 **3.** 239688 **4.** 237687

67. An equilateral triangle ABC is inscribed in a circle with centre O. D is a point on the minor arc BC and ∠CBD = 40°. Find the measure of ∠BCD.
1. 30° **2.** 50° **3.** 20° **4.** 40°

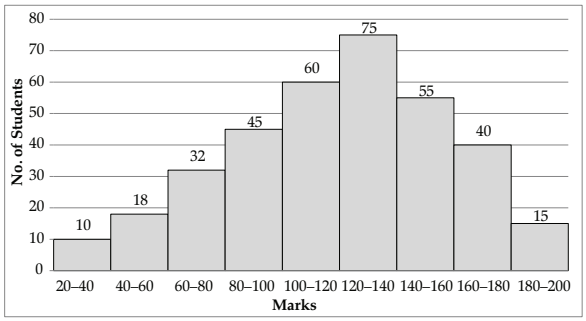
68. The ratio of the monthly incomes of A and B is 11 : 13 and the ratio of their expenditures is 9 : 11. If both of them manage to save ₹4,000 per month, then find the difference in their incomes (in ₹).
1. 2,500 **2.** 3,200 **3.** 4,000 **4.** 3,000

69. The average weight of P and his three friends is 55 kg. If P is 4 kg more than the average weight of his three friends, what is P's weight (in kg)?
1. 54 **2.** 58 **3.** 62 **4.** 60

70. If $x + y + 3 = 0$, then find the value of $x^3 + y^3 - 9xy + 9$.
1. – 18 **2.** –36 **3.** 18 **4.** 36

71. The given histogram represents the marks of students in Mathematics test of a certain class. The total number of students is 350.

Study the graph and answer the question that follows.



What is the ratio of the total number of students who scored 140 marks and above to the total number of students who scored marks between 60 to 120?
1. 110 : 137 **2.** 9 : 11 **3.** 11 : 9 **4.** 137 : 110

72. The angle of elevation at the top of an unfinished tower at a point distant 78 m from its base is 30°. How much higher does the tower be raised (in m) so that the angle of elevation of the top of the finished tower at the same point will be 60°?
1. $78\sqrt{3}$ **2.** 80 **3.** $52\sqrt{3}$ **4.** $26\sqrt{3}$

73. Find the value of the following expression:
$372 \div 56 \times 7 - 5 + 2$
1. 58 **2.** $-2\frac{95}{98}$ **3.** $43\frac{1}{2}$ **4.** $2\frac{93}{98}$

74. LCM of two numbers is 56 times their HCF, with the sum of their HCF and LCM being 1,710. If one of the two numbers is 240, then what is the other number?
1. 57 **2.** 171 **3.** 1,680 **4.** 210

75. Some students (only boys and girls) from different schools appeared for an Olympiad exam. 20% of the boys and 15% of the girls failed the exam. The number of boys who passed the exam was 70 more than that of the girls who passed the exam. A total of 90 students failed. Find the number of students that appeared for the exam.
1. 420 **2.** 400 **3.** 500 **4.** 350

English Comprehension

76. Select the option that expresses the given sentence in passive voice.
She handles all tasks efficiently.
1. All tasks are being handled efficiently by her.
2. All tasks were handled efficiently by her.
3. All tasks have been handled efficiently by her.
4. All tasks are handled efficiently by her.

77. Select the option that expresses the given sentence in active voice.
All weapons were surrendered by them.
1. They have surrendered all weapons.
2. They surrendered all weapons.
3. They had surrendered all weapons.
4. They are surrendering all weapons.

78. Select the most appropriate option that can substitute the underlined segment in the given sentence. If there is no need to substitute it, select 'No substitution required'.
The authorities **are assured** the people that they will look into the matter.
1. has assured **2.** have assured
3. have been assured **4.** No substitution required

79. Select the most appropriate ANTONYM of the given word.
Modest
1. Glum **2.** Sullen **3.** Unhappy **4.** Conceited

80. Select the option that can be used as a one-word substitute for the given group of words.
The study of earthquakes
1. Geology **2.** Geography
3. Topography **4.** Seismology

81. Select the most appropriate option to substitute the underlined segment in the given sentence. If there is no need to substitute it, select 'No substitution required.'
A tigress **has given birth** to a cub in the Ranthambore Tiger Reserve, taking the big cat population to 78.
1. is given births **2.** was birthed
3. has give birth **4.** No Substitution required

82. Select the most appropriate meaning of the given idiom.
Be hard up
1. Unable to calculate **2.** Have very little money
3. Have difficulty in climbing stairs
4. Find it very difficult to wake up early

83. The following sentence has been split into four segments. Identify the segment that contains a grammatical error.
Every / curious child / want to / rip open a toy.
1. curious child **2.** rip open a toy
3. Every **4.** want to

84. The following sentence has been divided into parts. One of them may contain an error. Select the part that contains the error from the given options. If you don't find any error, mark 'No error' as your answer.
It was / the very well-directed film / and we enjoyed it.
1. the very well-directed film
2. No error **3.** and we enjoyed it **4.** It was

85. Select the INCORRECTLY spelt word.
1. Tution **2.** Circuit **3.** Genuine **4.** Manners

86. Select the option that expresses the given sentence in direct speech.
He asked me when I had booked the flight tickets.
1. He said to me, "When do you book the flight tickets?"
2. He said to me, "When did you book the flight tickets?"
3. He said to me, "When are you booking the flight tickets?"
4. He said to me, "When you had book the flight tickets?"

87. The following sentence has been divided into parts. One of them may contain a grammatical error. Select the part that contains the error from the given options. If you don't find any error, mark 'No error' as your answer.
If the economy fails / this year it reflect badly / on the government.
1. this year it reflect badly **2.** No error
3. on the government **4.** If the economy fails

88. Select the most appropriate option to fill in the blank.
The increasing concerns about climate change point to the need for enhanced efforts towards _____ sustained growth.
1. achieving **2.** to achieve **3.** achieved **4.** achieve

89. Select the option that can be used as a one-word substitute for the given group of words.
To walk aimlessly
1. Amble **2.** Crawl **3.** Sprint **4.** Slither

90. Select the most appropriate synonym of the given word.
ostentatious
1. showy **2.** tasteful **3.** sudden **3.** quick

91. Select the most appropriate meaning of the given idiom.
In the same breath
1. Try and hold your breath
2. Say two contradictory things at the same time
3. Able to get a foul smell
4. Practice breathing exercises

92. Select the most appropriate antonym of the given word.
Raze
1. Build **2.** Ease **3.** Comfort **4.** Ruin

93. Select the most appropriate synonym of the given word.
Retaliate
1. Clap **2.** React **3.** Facilitate **4.** Rotate

94. Select the most appropriate synonym of the given word.
Avert
1. Permit **2.** Confront **3.** Face **4.** Prevent

95. The following sentence has been split into segments. One of them may contain an error. Identify the segment that contains a grammatical error. If you don't find any error, mark 'No error' as your answer.
No one were / present when I / entered the hall.
1. No one were **2.** present when I **3.** No error **4.** entered the hall

Comprehension:

In the following passage, some words have been deleted. Read the passage carefully and select the most appropriate option to fill in each blank.

The rise in the Irrawaddy dolphin (1) _____ in Chilika can be attributed to the eviction of (2) _____ fish enclosures. After thousands of hectares of Chilika lake were made (3) _____ free, Irrawaddy dolphins found unobstructed area for movement. (4) _____, due to the COVID-19 lockdown last year, there were comparatively fewer tourist boats on Chilika lake, which made it (5) _____ for dolphins to move from one part of the lake to another.

96. Select the most appropriate option to fill in blank no. 1.
1. population **2.** clan **3.** natives **4.** inhabitants

97. Select the most appropriate option to fill in blank no. 2.
1. unwarranted **2.** illegal
3. illegitimate **4.** unconstitutional

98. Select the most appropriate option to fill in blank no. 3.
1. trespass **2.** confiscation
3. intervention **4.** encroachment

99. Select the most appropriate option to fill in blank no. 4.
1. Whereas **2.** Moreover
3. Nevertheless **4.** However

100. Select the most appropriate option to fill in blank no. 5.
1. conducive **2.** hurtful **3.** detrimental **4.** disturbing

Answer Key

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

Answers with Explanations

General Intelligence and Reasoning

1. Option (3) is correct.
Explanation:
Table of Alphabetical series (point to remember)

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14

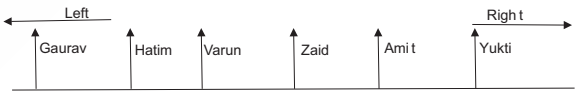
Now,

3	8	8	1	16	1	11
C	H	H	A	P	A	K
↓1+1	↓1+2	↓1+3	↓1+4	↓1+5	↓1+6	↓1+7
D	J	K	E	U	G	R
4	10	11	5	21	7	18

Similarly,

13	1	12	1	14	7	1
M	A	L	A	N	G	A
↓1+1	↓1+2	↓1+3	↓1+4	↓1+5	↓1+6	↓1+7
N	C	O	E	S	M	H
14	3	15	5	19	13	8

2. Option (3) is correct.
Explanation:



Hence, Hatim is the second left of Zaid.

3. Option (2) is correct.
Explanation: According to the BODMAS rule,

B	Bracket in order (), [], {}
O	Of
D	Division (÷)
M	Multiplication(×)
A	Addition (+)
S	Subtraction (–)

By checking options one by one and interchanging accordingly.

(1) +, ÷, –, ×, =
LHS,
=6 + 48 ÷ 36 – 6 × 15 = 53
=60 + 1.33 – 6 × 15
=60 + 1.33 – 80
=– 18.67 ≠ RHS

(2) +, ÷, ×, –, =
LHS,
=6 + 48 ÷ 36 × 6 – 15 = 53
=60 + 1.33 × 6 – 15
=60 + 8 – 15
=53 = RHS

(3) ÷, +, ×, –, =
LHS,
=6 ÷ 48 + 36 × 6 – 15 = 53
=1.25 + 36 × 6 – 15
=1.25 + 216 – 15
=217.25 – 15
=202.25 ≠ 53 ≠ RHS

(4) ×, ÷, +, –, =
=6 × 48 ÷ 36 + 6 – 15 = 53
=60 × 1.34 + 6 – 15
=80 + 6 – 15
=86 – 15
=71 ≠ 53 ≠ RHS

Hence, correct answer is +, ÷, ×, –, =

4. Option (3) is correct.
Explanation:

5. Option (2) is correct.
Explanation:
_Z_C_LZ_C_L_X_VL_ _ _ V
Count the number of elements in the series i.e.,20
Now, make factors of 20 i.e., 5 and 4
Now, divide it into 5 equal parts.
LZXCV / LZXCV / LZXCV / LZXCV

6. Option (3) is correct.t
Explanation:
'@' means 'addition',
'%' means 'multiplication',
'$' means 'division' and
'#' means 'subtraction',
29 @ 128 $ 16 % 7 # 22
= 29 + 128 ÷ 16 × 7 – 22
Now using BODMAS rule, we have

B	Bracket in order (), [], {}
O	Of
D	Division (÷)
M	Multiplication(×)
A	Addition (+)
S	Subtraction (–)

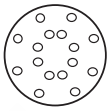
=29 + 8 × 7 – 22
=29 + 56 – 22
=85 – 22
= 63

7. Option (1) is correct.
Explanation:

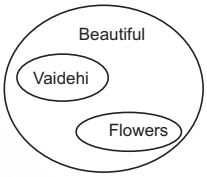
The above figure embedded is shown below:

8. Option (4) is correct.
Explanation:

The logic of symmetry follows here in the given figure.



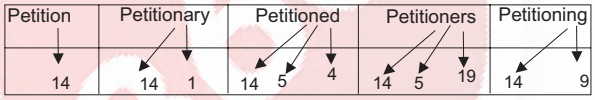
9. Option (1) is correct.
Explanation:



From the above diagram, both Vaidehi and flowers are beautiful, but there is no definite relation between Vaidehi and flowers. Hence, Vaidehi is a flower is wrong. All flowers are beautiful. Hence, some flowers are beautiful is the correct answer.

10. Option (4) is correct.
Explanation:
D E N S S R

11. Option (3) is correct.
Explanation:
For letters in the alphabetical series



12. Option (3) is correct.
Explanation:
Table of Alphabetical series (point to remember)

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14

Trick: Consonant alphabet +3
Vowel alphabet –3
Now,

2	1	3	20	5	18	9	1
B	A	C	T	E	R	I	A
+3	-3	+3	+3	–3	+3	–3	–3
E	X	F	W	B	U	F	X
5	24	6	23	2	21	6	24

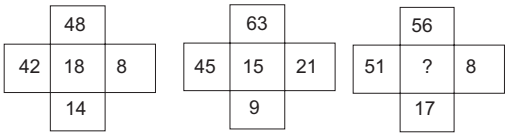
Similarly,

23	15	21	14	4	19
W	O	U	N	D	S
+3	–3	–3	+3	+3	+3
Z	L	R	Q	G	V
26	12	18	17	7	22

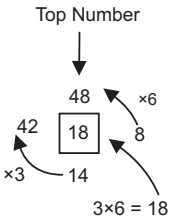
13. Option (1) is correct.
Explanation: Given that:
48 63 56
42 18 8 45 15 21 51 ? 8

14 9 17

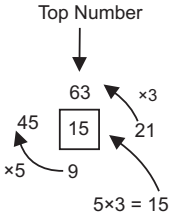
This can be written as:



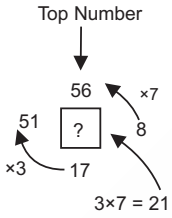
Now,



Similarly,



Similarly,



Hence, option (1) is the correct answer.

14. Option (4) is correct.

Explanation: Given series is as follows:

TSF, RPJ, PMN, NJR, ?

T	–2 gives	R	–2	P	–2	N	–2	L
20		18		16		14		12

S	–3 gives	P	–3	M	–3	J	–3	G
19		16		13		10		7

F	+4 gives	J	+4	N	+3	R	+3	V
6		10		14		18		22

Hence, LGV is the correct answer.

15. Option (3) is correct.

Explanation:

Table of Alphabetical series (point to remember)

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14

Trick: Vowels -place the value of the vowel

Consonants - place value of letter opposite to consonant letter

Then, write the place value of coded number in reverse order

3	18	15	23	4
C	R	O	W	D
		same		
X	I	O	D	W
24	9	15	4	23

Now, the code is 23 4 15 9 24.

T	R	H	I	C	K
20	18	8	9	3	11
		same			
G	I	S	I	X	P
7	9	19	9	24	16

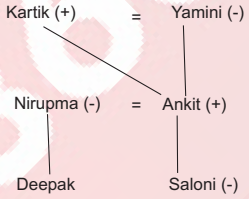
Now, the code is 162491997.

F	R	U	G	A	L
6	18	21	7	1	12
		same			
U	I	U	T	A	O
21	9	21	20	1	15

Now, the code is 1512021921.

16. Option (4) is correct.

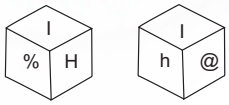
Explanation:



Hence, Kartik is the father of Ankit.

17. Option (4) is correct.

Explanation:



Find the common face in both the dice and move either in a clockwise or anticlockwise direction. From that face

Dice 1 ----------I-----H-----%------- (Clockwise)

Dice 2 ----------I-----@-----h------ (Clockwise)

Hence, "@" is the opposite to "H."

18. Option (1) is correct.

Explanation: Given that:

223 : 350 :: 519 : ?

Logic:

Sum of digits of first number +1= sum of digits of second number

Hence,

233 = 2+2+3+1 = 8

350 = 3+5+0= 8

Similarly,

519 = 5+1+9+1=16

Now, choose an option to get 16 in a similar way.

Hence,

736 = 7+3+6=16

19. Option (4) is correct.

Explanation:

Table of Alphabetical series (point to remember)

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13

Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14

Now,

S –3 gives	P opposite	k
19	16	11

Similarly,

J -3 gives	G opposite	T
10	7	20

Similarly,

P -3 gives	M opposite	N
16	13	14

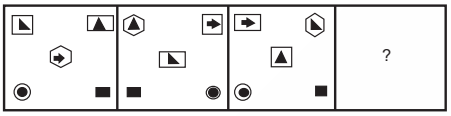
Similarly,

G opposite	T -3	O
7	20	17

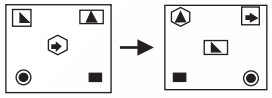
In this way Option (4) is different from the other 3 options, and hence it is the correct answer.

20. Option (4) is correct.

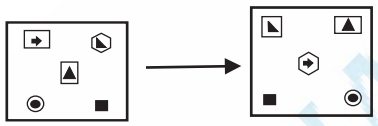
Explanation:



The upper three outer figures inside the square moves in a clockwise direction.



Following the same logic



21. Option (2) is correct.

Explanation:

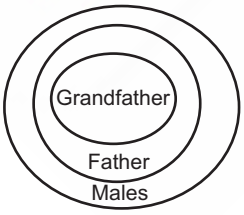
6219 = Sachin is a cricketer
2646= He played from Mumbai
Logic: The number of letters in the word is code for that word

Mumbai	is	very	famous
6	2	4	6

6246 is the correct answer.

22. Option (2) is correct.

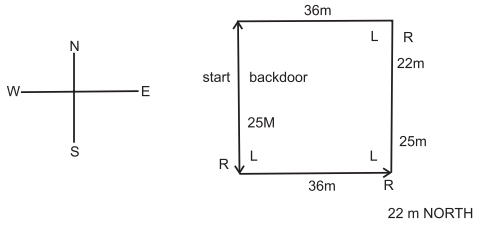
Explanation:



All grandfathers are fathers, and both grandfathers and father are male.

23. Option (1) is correct.

Explanation:



24. Option (2) is correct.

Explanation:

Let price of each pen = ₹ x
Let the price of each notebook =₹ y
According to the question:

	PEN	NOTEBOOK	TOTAL AMOUNT
Mohit	$3x$	$6y$	180
Sudesh	$5x$	$2y$	116

$(3x + 6y = 180) \times 5$ ----(i)
$(5x + 2y = 116) \times 3$ ----(ii)
Now,
(i) – (ii)

$$15x + 30y = 900$$
$$-(15x + 6y = 348)$$

We will get

$$24y = 552$$
$$y = 23$$

Hence, amount spend by Mohit on notebook is $6y = 6 \times 23$ = Rs.138

25. Option (3) is correct.

Explanation:

5, 18, 70, 278, ?

Logic:

$5 \times 4 - 2 = 18$
$18 \times 4 - 2 = 70$
$70 \times 4 - 2 = 278$
$278 \times 4 - 2 = 1110$

General Intelligence and Reasoning

26. Option (1) is correct.

The numerical taxonomy of plants is based on all of their observable characteristics. It is also referred to as Phenetics or Taximetrics. This is done with the help of computers. All the observable characters are taken into consideration and each character is assigned a code and number. In case any two characters resemble each other, they should be given equal weight. Character correlation is entirely dependent on the group of plants/organisms being studied which indirectly helps to identify separate taxa.

27. Option (2) is correct.

The National emblem of India was adopted on 26 January 1950. It is used by the union, and many state governments, along with many government agencies. It was adopted from the Lion Capital of Ashoka Pillar at Sarnath, Uttar Pradesh. The lion capital of Ashoka is an ancient sculpture dating back to 280 BCE during the Maurya Empire.

The emblem is a three-dimensional structure in which only three Asiatic lions are visible and the fourth one is hidden from the view. The Dharma Chakra or wheel appears in the centre with a bull on the right and a galloping horse on the left, and outlines of Dharma Chakras on the extreme right and left. The motto below the abacus is inscribed in the Devanagari script is Satyameva Jayate which means Truth alone triumphs. The motto has been taken from the Mundaka Upanishad, which is an ancient Hindu Veda.

28. Option (2) is correct.

Tirath Singh Rawat was the ninth Chief Minister of

Uttarakhand in March 2021. He had the shortest duration as the Chief Minister of Uttarakhand from March 2021–July 2021. He was also the first Education Minister of Uttarakhand. The current and tenth Chief Minister of Uttarakhand is Pushkar Singh Dhami.
Madan Kaushik is the state president of the BJP in Uttarakhand.
Major General BC Khanduri was the Chief Minister of Uttarakhand from 2007 to 2009 and 2011 to 2012.
Dhan Singh Rawat is the Minister of Higher Education in the Govt of Uttarakhand.

29. Option (4) is correct.

The allocation towards health and well-being was increased by 137% over the previous year in Union Budget 2021–22. The budget allocated was ₹ 2,23,846 crores for the year 2021–22 in comparison to the previous year's 94,452 crores. The Union Budget 2021–22 was based on six pillars with health and well-being one of the pillars.
The budget proposed a new centrally sponsored initiative called the PM AtmaNirbhar Swasth Bharat Yojana. This Yojana came with a total outlay of about ₹ 64,180 crores for over six years. Under this, ₹ 35,000 crores was set aside for for Covid-19 vaccines.

30. Option (1) is correct.

Sri Aurobindo is the author of the book 'The Secret of the Veda.' He is an Indian poet, yogi, author, and philosopher. Sri Aurobindo developed the spiritual practice called Integral Yoga and his literary works include The Life Divine, The Synthesis of Yoga, Savitri.

31. Option (2) is correct.

Pneumatophores are specialised roots in hydro-phytes. These roots come out of the water and help the hydrophytic plants to exchange gases for respiration. These are commonly found in mangrove plants, and are modified roots and grow vertically upwards. These are also called as air roots and are helpful for the plants to breathe in the wet environment.

32. Option (1) is correct.

The World Water Day is observed on 22 March. The theme of 2022 was Groundwater- Making the invisible visible. This day has been observed every year since 1993. Celebration of the day aims to highlight the global water crisis by focusing on the United Nation's Sustainable Development Goal (SDG) 6: water and sanitation for all by 2030.
29 March is celebrated as the World Piano Day. It is the 88th day of the year which also resonates with 88 keys on the piano.
5 April of each year is observed as the International Day of Conscience. This day was first observed in the year 2020. The day commemorates the importance of human conscience.

33. Option (3) is correct.

Prithviraj Chauhan defeated Muhammad Ghori in the First Battle of Tarain in 1191 AD. The first battle of Tarain or Taroari was fought between the Ghurid army and Rajputs. It happened in Taraori, near Karnal, Haryana. It was won by the Rajput's however Muhammad Ghori managed to escape and returned to Ghazni. The Second battle of Tarain was fought between the two again in 1192, but this time it was won by Muhammad Ghori. This won actually led to the establishment of Mughal seat in Delhi.

34. Option (1) is correct.

The 'Lotteries Regulation Act' was passed in 1998. This law lays down the standards for the central government to handle the Indian lotteries. The 2(a) defines 'bumper draw of lottery' and section 2(b) of the act defines 'lottery'.
Lottery is defined as a scheme for distribution of prizes by lot or chance to those people participating in the chances of a prize by purchasing tickets.
This act was passed in lieu for large number of complaints alleging malpractices in running of lotteries in several states.

35. Option (1) is correct.

Ghatam is a large, narrow-mouthed earthenware pot used as a percussion instrument. Basically, it is a clay pot with narrow mouth and is mostly manufactured in Manamadurai, a place near Madurai in Tamil Nadu.
A pander is a small handheld drum that resembles a tambourine. It is basically a small hand held drum whose size ranges between 23–28 inches.
Mridangam is a percussion instrument made of leather and jackwood and is used in many South Indian states. It is a bifacial drum of the Carnatic museum, which has a cylindrical body tampered at both the ends.

36. Option (1) is correct.

Goods and Services Tax (GST) is the single indirect tax of India, which had replaced most of the previous indirect taxes such as excise duty, purchase tax, entertainment tax, Value Added Tax (VAT), etc. It is also known as the 'One Nation One tax' and was rolled out on 1 January 2017. It subsumed 17 large taxes and 13 cesses. There are five slabs of taxation under the GST MODEL- 0%, 5%, 12%, 18%, and 28%. It is also known as the 101st amendment of the constitution of India. The GST council is the governing body of GST and is headed by the Union Finance Minister.

37. Option (1) is correct.

Tribes of the Nicobar Islands pay their respects to the departed soul of the head of the family during the Ossuary Fest. The Nicobarese tribe living on the Car Nicobar island celebrate Ossuary Fest. On this festival the Nicobarese folk dance is organised and people are invited to participate in it. It happens on a full moon night and they dance in a circular fashion with men and women dancing separately. The dancers wear the traditional costume which consists of coconut and plantain leaves around their heads and waist. The next morning is followed by a pig fight.

38. Option (2) is correct.

GDP stands for the Gross Domestic Product. It is basically a monetary measure of all the final goods and services sold in a country over a period of time. It takes into consideration the goods and services sold inside the geographical boundary of the country.
GDP includes only those final goods for which consumers have paid and they have been sold. This means only marketed goods are considered while estimating GDP. Hence, statement I is correct.
The work done by a housewife at her home like cooking, cleaning, etc. is non-monetary in nature and thus not included in the calculation of GDP. Hence, Statement II is correct.
In order to avoid double calculation, the interme-diate goods are kept outside the purview of GDP and only the final goods and services are taken into consideration. Hence, statement III is correct.
GNP or Gross National Product is the value of all goods and services that are owned by the citizen of a country. GNP does not restrict the goods and services based on the geographical boundaries of the country.

39. Option (1) is correct.

Tamralipti was an important port city in ancient India. It was also known as 'Tamralipta' and was the capital of Suhma Kingdom in ancient Bengal. The name is derived from the Sanskrit word 'Tamra' which means 'copper'. The mining of copper used to happen in nearby Singbhum region and the trade of copper happened through this port, thus giving it the name 'Tamralipti.' It connects India with Ceylon, Java, China, and West.
Shravasti was the capital of Kingdom of Kosala and is situated in Uttar Pradesh. This is the place where the Buddha lived most after his enlightenment and is one of the most revered sites in Buddhism.
Ahichhatra was the ancient capital of Northern Panchala, a northern Indian kingdom mentioned in the Mahabharata. It was in the modern day Ramnagar village, Bareilly, Uttar Pradesh.
Champa or Campa was the capital of Anga and was in the modern day Bihar.

40. Option (1) is correct.
Abatement is reducing the degree or intensity of, or eliminating pollution. The different examples of methods used for abatement of pollution are restoration, recovery of natural resources, or reclamation. For the method to be successful, it is very important to identify the causes of pollution.
Aeration is the process of mixing, circulating or dissolving air with a liquid or fluid.
Aerosol is a suspension of fine solid particles or liquid in air or another gas. For example: Dust, mist or fog, forest exudates, etc.
Absorption is a process in which particles such as atoms, molecules, or ions enter liquid or solid material. It can be a physical or chemical process.

41. Option (4) is correct.
Mumbai City FC won the Indian Super League 2020–21 by defeating ATK Mohun Bagan. This was the seventh season of Indian Super League (ISL). ISL was played in Goa. ISL is a professional league for men's association football club. It comprises 11 clubs with the official sponsor being Hero MotoCorp.

42. Option (1) is correct.
The former Spanish footballer, Antonio Lopez Habas, was the coach of the at ATK Mohun Bagan Hero ISL 2020–21. ATK Mohun Bagan is a West Bengal based football club which was founded as a result of merger between football section of mini sport club Mohun Bagan AC and ATK FC.
Football club Goa is the professional football club also known as Gaurs and is based in Goa. It competes in ISL and was established on 26 August 2014.
Kerala Blasters is a professional football club in Kochi, Kerala. It is also known as Manjappada (Yellow Army) and The Tuskers. It was established in May 2014.
SC East Bengal Club is a professional football club in Kolkatta, West Bengal. It is also known as Red and Gold Brigade, Laal Holud, Bangal Brigade, and Torch Bearers. It was founded on 1 August 1920.

43. Option (3) is correct.
Dhaulgiri I peak is also known as white mountain. It is located in Nepal and is the seventh highest mountain in the world with a height of 8,167 metres above the sea level. Dhaulagiri is derived from two Sanskrit words namely 'Dhaul' which means 'dazzling, white, beautiful and 'Giri' means 'Mountain.' Dhaulagiri I is also the highest point of the Gandaki river basin.
'Cho Oyu' is the sixth highest mountain in the world which is situated at a height of 8,188 metres above the sea level. 'Cho Oyu' means 'Turquoise Goddess' in Tibetan. It is situated on the border between Nepal and Tibet at the Western edge of the mountainous Khumbu region. It is about 20 km from the Mount Everest.
Makalu is the fifth highest mountain in the world which is situated at a height of 8,481 metres. It is located in the Mahalangur Himalayas 19 km (12 mi) southeast of Mount Everest, in Nepal.
Lhtose is the fourth highest mountain in the world which is situated at a height of 8,516 metres above the sea level. It is on the border between Tibet Autonomous Region of China and the Khumbu region of Nepal.

44. Option (4) is correct.
'Ring of Fire' is associated with the Pacific Ocean. It is also known as the Pacific Ring of Fire, the Rim of Fire, the Girdle of Fire or the Circum-Pacific belt. This region around the Pacific Ocean is prone to many volcanic eruptions and earthquakes. It is a horseshoe-shaped belt which is 40,000 km long and 500 km wide. It includes the Pacific coasts of South America, North America and Kamchatka, and some islands in the western Pacific Ocean. It is formed as a result of the tectonic plates and consists of 750–915 volcanoes that have been active during the Holocene.

45. Option (2) is correct.
The 86th Amendment Act, 2002 led to the addition of Article 21-A in the Indian constitution. Under this article, the children aged between six to fourteen years are entitled for free and compulsory education. Article 51-A was amended which states that it was the fundamental duty of the parents and guardians of children aged between six and fourteen to provide opportunities of education to the children. The amendment also changed the subject matter of Article 45 in Directive Principles.
The 85th constitutional amendment act, 2001 gave consequential seniority to SCs and STs in matters of reservation in promotion. This led to the amendment of article 16 of the Indian constitution.
The 88th constitutional amendment act, 2003 led to the provision of service tax under article 268-A. This is levied by the central government.
The 89th constitutional amendment act, 2003 led to the bifurcation of the National Commission for Scheduled Castes and Scheduled Tribes into two separate bodies. These were- National Commission for Scheduled Castes (Article 338) and National Commission for Scheduled Tribes (Article 338-A).

46. Option (1) is correct.
The theme for International Mother Earth Day, 2021 was 'Restore our Earth'. It is observed on 22 April every year and is a United Nations Day. This day is celebrated to raise awareness around the environment and support environmental protection and making our Earth a better place to live. The Earth Day was celebrated for the first time on 22 April 1970 when peace activist John Mc Connell proposed to honour planet and the concept of peace during a UNESCO conference in San Francisco.
Theme 2022- Invest in Our Planet

47. Option (3) is correct.
From March–April 2021, the states that went through election were Tamil Nadu, Kerala, West Bengal, and Assam. The Union Territory in which elections were held was Puducherry.
Chief Minister of Tamil Nadu- MK Stalin
Chief Minister of Kerala-Pinarayi Vijayan
Chief Minister of West Bengal-Mamta Banerjee
Chief Minister of Assam- Himanta Biswa Sarma
Chief Minister of Puducherry- N. Rangasamy

48. Option (1) is correct.
The British East India Company captured Pondi-cherry (Puducherry) from the French in the year 1761. Though it was captured in the year 1761, it had to be restored under French administration by the Treaty of Paris in 1763.
Again during the French Revolution of 1793, British East Indian company took control of the region and returned to the 'French East India Company' in 1814. When British East India company took control over the whole of India they let 'French East India company' retain their settlements at Pondicherry, Mahe, Yanam, Karaikal and Chandronagor.

49. Option (3) is correct.
According to Ramsar Convention, the world Wetlands day is observed on 2 February. This day marks the anniversary of the Convention on Wetlands, which was adopted as an international treaty in 1971. The Ramsar convention was signed in Ramsar on the shores of the Caspian Sea, Iran. The convention is an intergovernmental treaty that establishes framework for the wise use of wetlands and their resources on a national and international level. As of 2022, India has 75 Ramsar sites and Tamil Nadu has the maximum number of them as 14.
The United Nations General Assembly (UNGA) established 2nd February as World Wetlands Day on 30 August 2021.
Theme for 2022 - "Wetlands Action for People and Nature".
Theme for 2023 - "Wetlands Restoration" 15th January is observed as the Indian Army Day. On this day the Indian army got its first Commander-in-chief , field Marshal Kodandera M Cariappa in the year 1949. He took over from the last British Commander-in-Chief, General Sir Francis Butcher.
19th December is observed as Goa's Liberation Day. Goa was released from Portuguese dominion in the year 1961.

50. Option (2) is correct.

Atleast a half of the carbon dioxide fixation on earth is carried out by algae through photosynthesis. Photosynthesis is a process by which plants and other organisms convert light energy into chemical energy. It is made up of two words- Photo means 'light' and synthesis means 'putting together'. The chemical energy which is generated is used as a fuel for different cellular activities. In this process, chemically, carbon dioxide is converted into sugar/glucose and oxygen. This is possible only in the presence of green pigment-chlorophyll. Carbon fixation is a process in which inorganic carbon is converted into organic compounds by living organisms.

Quantitative Aptitude

51. Option (1) is correct.

A sold phone to B at profit of 25%

B sold phone to C at a loss of 10%

Given that total money paid by C = ₹ 5,625

Let us assume that A paid for the mobile phone = y

So, $y\times\left(\frac{125}{100}\right)\times\left(\frac{90}{100}\right)=5,625$

$\Rightarrow \quad y=5,625\times\left(\frac{100}{125}\right)\times\left(\frac{100}{90}\right)$

$\Rightarrow \quad y=5,000$

A paid ₹ 5,000 for the mobile phone.

52. Option (1) is correct.

$$\frac{\sin 23^\circ\cos 67^\circ+\sec 52^\circ\sin 38^\circ+\cos 23^\circ\sin 67^\circ+\operatorname{cosec}52^\circ\cos 38^\circ}{\operatorname{cosec}^2 20^\circ-\tan^2 70^\circ}$$

$$=\frac{\sin 23^\circ\cos(90^\circ-23^\circ)+\sec 52^\circ\sin(90^\circ-52^\circ)+\cos 23^\circ(90^\circ-23^\circ)+\operatorname{cosec}52^\circ\cos(90^\circ-52^\circ)}{\operatorname{cosec}^2(90^\circ-70^\circ)-\tan^2 70^\circ}$$

$$=\frac{\sin 23^\circ\sin 23^\circ+\sec 52^\circ\cos 52^\circ+\cos 23^\circ\cos 23^\circ+\operatorname{cosec}52^\circ\sin 52^\circ}{\sec^2 70^\circ-\tan^2 70^\circ}$$

{Since, sin(90° – A) = cosA, cos (90° – A) = sinA, cosec (90° – A) = secA}

$$=\frac{\sin^2 23^\circ+\sec 52^\circ\cos 52^\circ+\cos^2 23^\circ+\operatorname{cosec}52^\circ\sin 52^\circ}{\sec^2 70^\circ-\tan^2 70^\circ}$$

$$=\frac{\sin^2 23^\circ+\cos^2 23^\circ+\sec 52^\circ\cos 52^\circ+\cos ec52^\circ\sin 52^\circ}{\sec^2 70^\circ-\tan^2 70^\circ}$$

{Since,$\sin^2 A+\cos^2 A = 1$, secA . cosA = 1, cosec A . sin A = 1 and $\sec^2 A-\tan^2 A = 1$}

$$=\frac{1+1+1}{1}=3$$

53. Option (2) is correct.

Given that speed of the motorboat in still water = 20 km/h

We know that if the speed of a boat in still water is x km/h and the speed of the stream is y km/h.

$\Rightarrow$ Downstream speed = $(x + y)$ km/h

Upstream speed = $(x – y)$ km/h

As per the given data, the motorboat takes 30 minutes more to go 24 km upstream than to cover the same distance downstream.

Let us assume that speed of the water = x km/h

$$\frac{24}{20-x}=\frac{24}{20+x}+\left(\frac{1}{2}\right)$$

(since, 30 min = $\frac{1}{2}$ h)

$$\Rightarrow \quad \frac{24}{20-x}-\frac{24}{20+x}=\left(\frac{1}{2}\right)$$

$$\Rightarrow \quad \frac{[24(20+x)-24(20-x)]}{400-x^2}=\frac{1}{2}$$

$$\Rightarrow \quad 96+48x-96+48x=400-x^2$$

$$\Rightarrow \quad x^2+96x-400=0$$

$$\Rightarrow \quad x^2+100x-4x-400=0$$

$$\Rightarrow \quad x(x+100)-4(x+100)=0$$

$$\Rightarrow \quad (x+100)(x-4)=0$$

$$\Rightarrow \quad x+100=0 \Rightarrow x=-100$$

[– is neglected]

$$\Rightarrow \quad x-4=0 \Rightarrow x=4$$

The speed of the water = 4 km/h

$\therefore$ Required time $=\frac{39}{(22+4)}+\frac{30}{(22-4)}$

$$=\frac{39}{26}+\frac{30}{18}=\frac{3}{2}+\frac{5}{3}$$

$$=\frac{19}{6}=3 \text{ h } 10 \text{ minutes}$$

54. Option (3) is correct.

Given that, AB is the diameter of the circle with centre O and ∠APC = 62°.

As per the given the figure will be:

Minor arc AC will create ∠CBA

∠APC = 62° = ∠APB

∠BAP = 90° (diameter perpendicular to tangent)

In ΔAPB,

∠APB + ∠BAP + ∠PBA = 180°

$\Rightarrow$ ∠PBA = 180° – (90° + 62°)

$\Rightarrow$ ∠PBA = 28°

55. Option (2) is correct.

A can finish the work in 16 days

Whereas, B can finish the same work in 12 days

A's 1 day work = $\frac{1}{16}$ th work

A's 4 day work = $4\times\frac{1}{16}=\frac{1}{4}$ th work

B's 1 day work = $\frac{1}{12}$ th work

B's 4 day work = $4\times\frac{1}{12}=\frac{1}{3}$ th work

The remaining work

$$=1-\left[\left(\frac{1}{4}\right)+\left(\frac{1}{3}\right)\right]=1-\left(\frac{7}{12}\right)=\frac{5}{12}$$

$\therefore$ Time taken by B to finish the work

$$=\left(\frac{5}{12}\right)\div\left(\frac{1}{12}\right)$$

$$=\left(\frac{5}{12}\right)\times 12=5 \text{ days}$$

Total number of days B work = 4 + 5 = 9 days

56. Option (4) is correct.

Given that side of the cube = 8 cm

The given container has a length of 16 cm, breadth of 8 cm, and height of 15 cm

We know that volume of cube = $(\text{side})^3$

The volume of a cuboid

= Length × Breadth × Height

According to the question,

The volume of cube
= The volume of the rectangular container (length = 16 cm, breadth = 8 cm, height of the water level rise)

Let us assume that the height of the water level will rise = y cm

So, $8^3 = 16 \times 8 \times y$

$\Rightarrow y = \frac{512}{128} = 4$

The rise of water level (in cm) is 4 cm

57. Option (2) is correct.

Given that, $(x + 6y) = 8$ ...(i)

and $xy = 2$ ...(ii)

where $x > 0$.

Since, $xy = 2$

Put $x = 2$ and $y = 1$ that's satisfied the eq. (i) and (ii)

Now $x^3 + 216y^3 = 8 + 216 = 224$

So, the value of $x^3 + 216y^3$ is 224.

58. Option (2) is correct.

Total exports of cars of type A and B (in ₹ millions) from 2014 to 2018 are given in the bar graph

The total exports of car-A in 2014 and 2017
= 200 + 175 = 375

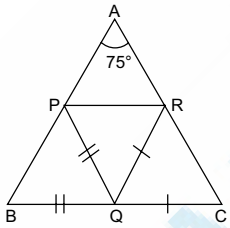
The total exports of car-B in 2015 and 2016
= 250 + 200 = 450

The required ratio = 375: 450 = 5:6

So, the ratio of the total exports of car-A in 2014 and 2017 to the total exports of car-B in 2015 and 2016 is 5 : 6.

59. Option (2) is correct.

As per given, the figure will be:



Given that, $\angle BAC = 75°$

$\angle ABC + \angle ACB + \angle BAC = 180°$
(By angle sum property)

$\angle ABC + \angle ACB + 75° = 180°$

$\angle ABC + \angle ACB = 180° - 75° = 105°$

Let, $\angle ABC = \angle PBQ = 70°$

and $\angle ACB = \angle RCQ = 35°$

Therefore,

$\angle PQR = 180° - (\angle PQB + \angle RQC)$

$\Rightarrow 180° - [(180° - 2\angle PBQ) + (180° - 2\angle RCQ)$ [BQ= PQ; QC = QR]

$\Rightarrow 180° - [(180° - 2 \times 70°) + (180° - 2 \times 35°)]$

$\Rightarrow 180° - (40° + 110°)$

$\Rightarrow 180° - 150° = 30°$

60. Option (1) is correct.

$4 \sin^2\theta = 3(1 + \cos\theta)$, $[0° < \theta < 90°]$

$4(1 - \cos^2\theta) = 3 + 3\cos\theta$

$\Rightarrow 4 - 4\cos^2\theta = 3 + 3\cos\theta$

$\Rightarrow 4\cos^2\theta + 3\cos\theta - 1 = 0$

$\Rightarrow 4\cos^2\theta + 4\cos\theta - \cos\theta - 1 = 0$

$\Rightarrow 4\cos\theta(\cos\theta + 1) - 1(\cos\theta + 1) = 0$

$\Rightarrow (4\cos\theta - 1)(\cos\theta + 1) = 0$

$\Rightarrow \cos\theta + 1 = 0$

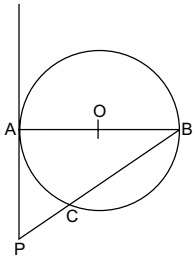
$\Rightarrow \cos\theta = -1$

[Not possible because $0° < \theta < 90$]

Therefore, $4\cos\theta - 1 = 0$

$\Rightarrow \cos\theta = \frac{1}{4}$

Let us assume a right triangle whose hypotenuse is $4k$ units and base is k units.



By Pythagoras theorem,

Altitude $= \sqrt{\text{Hypot.}^2 - \text{base}^2}$

$= \sqrt{(4k)^2 - k^2} = \sqrt{15k}$

$\cos\theta = \frac{1}{4}$

$(2\tan\theta + 4\sin\theta - \sec\theta)$

$= (2 \times \sqrt{15}) + (4 \times \frac{\sqrt{15}}{4}) - 4$

$= 2\sqrt{15} + \sqrt{15} - 4$

$= 3\sqrt{15} - 4$

61. Option (2) is correct.

The length of the given triangle is $(x - 1)$ cm, $(x + 1)$ cm and $(x + 3)$ cm.

Here, the longest side is $(x + 3)$cm. So, it is the hypotenuse.

$\therefore (x + 3)^2 = (x + 1)^2 + (x - 1)^2$

$\Rightarrow x^2 + 6x + 9 = 2(x^2 + 1)$

[By using $(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$ formula]

$\Rightarrow x^2 + 6x + 9 = 2x^2 + 2$

$\Rightarrow 2x^2 - x^2 - 6x + 2 - 9 = 0$

$\Rightarrow x^2 - 6x - 7 = 0$

$\Rightarrow x^2 - 7x + x - 7 = 0$

$\Rightarrow x(x - 7) + 1(x - 7) = 0$

$\Rightarrow (x + 1)(x - 7) = 0$

$\Rightarrow x + 1 = 0 \Rightarrow x = -1$

[–sign will be neglected]

$\Rightarrow x - 7 = 0 \Rightarrow x = 7$

Then,the value of $(x + 3) = (7 + 3)$ cm = 10 cm

$\therefore$ The hypotenuse of the right-angled triangle (in cm) is 10 cm.

62. Option (1) is correct.

Successive interest of $a\%$ and $b\%$

$= [a + b + \frac{ab}{100}]\%$

So the successive interest for 2 years

$= [10 + 10 + \frac{10 \times 10}{100}]\% = 21\%$

So, the successive interest for 3 years

$= [21 + 10 + \frac{21 \times 10}{100}]\% = 33.1\%$

The successive interest for 4 years

$= [33.1 + 10 + \frac{33.1 \times 10}{100}]\% = 46.41\%$

The difference of interest between 4 and 2 years
= 46.41 – 21 = 25.41%

So, 25.41% → 5,082

Therefore, $100\% \rightarrow \left(\frac{5,082}{25.41}\right) \times 100 = 20,000$

So, the sum is ₹ 20,000

63. Option (2) is correct.

Given, C.P. of an item = ₹ 400

S.P. of an item = ₹ 216

Sale discount = $x\%$

Coupon discount = 10%

We know that successive discount of $a\%$ and $b\%$

$= \left(a + b - \frac{ab}{100}\right)\%$

Here, M.P. = C.P. of an item = ₹ 400
(Because discount is given on this price.)

The discount = 400 – 216 = ₹ 184

Total discount $= \frac{184}{400} \times 100 = 46\%$

So, $x+10-\left(\frac{10x}{100}\right)=46$

$\Rightarrow \quad x+10-\frac{x}{10}=46$

$\Rightarrow \quad \frac{9x}{10}+10=46$

$\Rightarrow \quad \frac{9x}{10}=46-10$

$\Rightarrow \quad \frac{9x}{10}=36$

$\Rightarrow \quad x=36\times\left(\frac{10}{9}\right)=40$

So,the value of x is 40%.

64. Option (1) is correct.

The number of cars passing the road near the colony from 6 am-12 noon has been shown in the given histogram.

No. of cars passed between 6 am - 8 am = 70 + 105 = 175

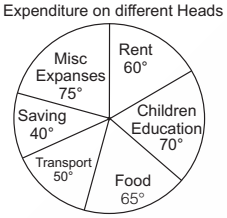
No. of cars passed between 9 am - 11 am = 115 + 95 = 210

The ratio = 175 : 210 = 5 : 6

Therefore, ratio of the number of cars passed between 6 am - 8 am to the number of cars passed between 9 am - 11 am is 5 : 6.

65. Option (4) is correct.

The monthly expenditure of a family on different heads is shown in the given pie chart.



Total angle of all expenditures

$= 75° + 60° + 70° + 65° + 50° + 40°$

$= 360°$

Total angle of the amount spent on Children's Education, Transport and Rent

$= 70° + 50° + 60° = 180°$

The percentage $= \left(\frac{180}{360}\right)\times 100 = 50\%$

So, amount spent on Children's Education, Transport and Rent is 50% of the total earnings.

66. Option (2) is correct.

Given number = $23a68b$

Option 1, the sum of the digits

$= 2 + 3 + 8 + 6 + 8 + 9$

= 36 (which is divisible by 3 and 9)

Option 2, the sum of the digits

$= 2+3+9+6+8+ 5$

= 33

(which is divisible by 3 but not divisible by 9)

Option 3, the sum of the digits

$= 2 + 3 + 9 + 6 + 8 + 8$

= 36 (which is divisible by 3 and 9)

Option 4, the sum of the digits

$= 2+3+7 +6 +8 + 7$

= 33

(which is divisible by 3 but not divisible by 9)

So, 239685 and 237687 are divisible by 3 but not divisible by 9

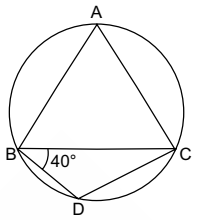
Greatest number among them = 239685

Therefore the greatest number is 239685 (divisible by 3 but not divisible by 9).

67. Option (3) is correct.

Given that triangle ABC is inscribed in a circle of centre O and $\angle CBD = 40°$.

We can draw the following figure by the given information:



$\angle ABC = \angle ACB = \angle BAC = 60°$

[Angles of equilateral triangle]

Now, $\angle BAC + \angle BDC = 180°$

[Opposite angles of cyclic quadrilateral]

$60° + \angle BDC = 180°$

$\Rightarrow \quad \angle BDC = 180° - 60° = 120°$

Also, $\angle CBD + 2\angle BDC + \angle BCD = 180°$

$40° - 120° + \angle BCD = 180°$

$\Rightarrow \quad \angle BCD = 180° - 40° - 120°$

$= 20°$

Therefore,the value of $\angle BCD$ is 20°.

68. Option (3) is correct.

	A	B	
Income	11	13	
Expenditure	9	11	
Savings	2	2	⟶ ₹ 4000

The difference is 2 unit = ₹ 4000

Income difference = 13 – 11 = 2 unit

So, the income difference = ₹ 4000

Therefore, difference between A and B's incomes is ₹ 4000

69. Option (2) is correct.

The total weight of P and his three friends = 55 × 4 = 220 kg

Let us assume that the average weight of three friends = x

Total weight of three friends = $3x$

Weight of P = $x + 4$

Then, $(x + 4) + 3x = 220$

$\Rightarrow \quad 4x + 4 = 220$

$\Rightarrow \quad 4x = 220 - 4 = 216$

$\Rightarrow \quad x = \frac{216}{4} = 54$

P's weight = 4 + 54 = 58 kg

The P's weight (in kg) is 58 kg

70. Option (1) is correct.

Given: $x + y + 3 = 0$

Now, $x^3 + y^3 - 9xy + 9$

$= x^3 + y^3 + 3xy(x + y) - 3xy(x + y) - 9xy + 9$

$= (x + y)^3 - 3xy(x + y + 3) + 9$

$= (-3)^3 - 3xy(0) + 9$

$= -27 + 9 = -18$

Shortcut: $x = 0, y = -3$

Now, $x^3 + y^3 - 9xy + 9$

$\Rightarrow 0 - 27 - 0 + 9$

$\Rightarrow -18$

71. Option (1) is correct.

Total no. of students = 350

Total no. of students who scored 140 or more marks

= 55 + 40 + 15 = 110

Total no. of students who scored marks between 60 to 120

= 32 + 45 + 60 = 137

The required ratio = 110: 137

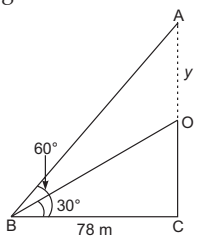
72. Option (3) is correct.

Given that, angle of elevation of the top of an unfinished tower at a point = 30°

Angle of elevation of the top of the finished tower at the point = 60°

And distance from the tower to the point = 78 m

We will draw a figure based on this:



From figure,

OC = Height of the unfinished tower

AC = Height of the finished tower's height

$$\text{In } \Delta OBC, \tan 30° = \frac{OC}{BC}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{OC}{78} \qquad \left[\tan 30° = \frac{1}{\sqrt{3}}\right]$$

$$\Rightarrow OC = \frac{78}{\sqrt{3}}$$

$$\Rightarrow OC = \frac{78\times\sqrt{3}}{\sqrt{3}\times\sqrt{3}} = 26\sqrt{3}$$

Let us assume the height of the tower will be raised (AO) = y

In ΔABC,

$$\tan 60° = \frac{AC}{BC}$$

$$\Rightarrow \sqrt{3} = \frac{OC+y}{78} \qquad [\tan 60° = \sqrt{3}]$$

$$\Rightarrow y + OC = 78\sqrt{3}$$

$$\Rightarrow y + 26\sqrt{3} = 78\sqrt{3}$$

$$\Rightarrow y = 78\sqrt{3} - 26\sqrt{3} = 52\sqrt{3}$$

So,tower will be raised by $52\sqrt{3}$ meters

73. Option (3) is correct.

We will solve the given expression by using BODMAS rule,

$$\frac{372}{56}\times 7 - 5 + 2 = \left(\frac{93}{14}\right)\times 7 - 5 + 2$$

$$= \left(\frac{93}{2}\right) - 5 + 2 = \left(\frac{93}{2}\right) - 3 = \frac{87}{2} = 43\frac{1}{2}$$

74. Option (4) is correct.

Given that, LCM of two numbers

= 56 × HCF and LCM + HCF

= 1710

Let us assume HCF = x and LCM = $56x$

According to question,

$x + 56x = 1710$

$$\Rightarrow 57x = 1710$$

$$\Rightarrow x = \frac{1710}{57} = 30$$

Then, HCF = 30 and LCM = 30 × 56 = 1680

One number = 240

Let us assume that another number = y

Therefore,

$30 \times 1680 = 240 \times y$

$$\Rightarrow y = \frac{(30\times 1680)}{240} = 210$$

Second number is 210

75. Option (3) is correct.

Let's assume that the number of boys and Girls appeared in exam be b and g respectively,

As per the question-

No. of boys passed in exam

$$= \frac{[(100-20)\times b]}{100} = 0.80b$$

No. of girls passed in exam

$$= \frac{[(100-15)\times g]}{100} = 0.85g$$

Condition (1):

$$\Rightarrow 0.80b = 0.85g + 70$$

$$0.80b - 0.85g = 70 \quad \text{...(i)}$$

Condition (2):

Total failed students = 90

$$\Rightarrow 0.20b + 0.15g = 90 \quad \text{...(ii)}$$

From equation(1) – [4 × eq (ii)]

$$\Rightarrow (-0.85g) - 0.60g = 70 - 360$$

$$\Rightarrow 1.45g = 290$$

$$g = 200$$

Put this value in equation (i)

$$0.80b = 0.85 \times 200 + 70$$

$$\Rightarrow 0.80b = 170 + 70 = 240$$

$$\Rightarrow x = 300$$

So, total number of students appeared in exam

= 300+ 200 = 500

English Comprehension

76. Option (4) is correct.

In the active voice, the sentence's subject performs the action. It is used to direct the reader's attention to the subject of a sentence. In the passive voice, the action's target is the focus, and the verb acts upon the subject. To convert active voice into passive voice, students need to identify the (S+V+O) subject, verb, and object in the active sentence.

Active: Subject + verb + s/es + object…

Passive: Object + is/are + verb (IIIrd from) + by + subject

77. Option (2) is correct.

In the active voice, the sentence's subject performs the action. It is used to direct the reader's attention to the subject of a sentence. In the passive voice, the action's target is the focus, and the verb acts upon the subject. To convert passive voice into active voice, students need to identify the (S+V+O) subject, verb, and object in the passive sentence.

Passive: Object + was/were + verb (IIIrd from) + by + subject

Active: Subject + past form of the verb + object

The given sentence is in passive voice in the past tense. The converted active voice would be option (2).

78. Option (2) is correct.

The sentence says that the authorities have given assurance, whereas the given sentence gives the impression that the authorities have been assured by someone or something. Hence, "are" should be replaced by "have."

79. Option (4) is correct.

The meaning of "modest" is "unassuming in the estimation of one's abilities or achievements." The antonym of "moderate"

is "conceited," which means "excessively proud of oneself; vain." Hence, the correct answer is option (4). Glum means sad, sullen, or unhappy.

80. Option (4) is correct.

The sentence checks a student's knowledge of vocabulary. The study of earthquakes is known as seismology. Hence, the correct answer is option (4). Geology is the science that deals with the earth's physical structure and substance, its history, and the processes that act on it. Geography is the study of the physical features of the earth and its atmosphere, and of human activity and its affects and is affected by these, including the distribution of populations and resources and political and economic activities. Topography is the art or practise of graphic delineation in detail, usually on maps or charts, of natural and man-made features of a place or region, especially in a way to show their relative positions and elevations.

81. Option (4) is correct.

The sentence is grammatically correct.

82. Option (2) is correct.

This question checks a student's knowledge of idiomatic expression. "Be hard up" means "to not have enough of something important or valuable." Example: They're hard up for options because of their financial troubles.

83. Option (4) is correct.

The given question has an error in subject-verb agreement. A singular subject must be followed by a singular verb, and a plural subject must be followed by a plural verb. Indefinite pronouns like each, every, anyone, anybody, neither, and either are followed by a singular verb. In the given sentence, the subject is "every," so the concerned verb should be in singular form 'wants'.

84. Option (1) is correct.

In the given question, the subject "well-directed film" is being talked about for the first time. Hence, it should be preceded by the indefinite article "a." So, replace "the very well-directed film" with "a very well-directed film."

85. Option (1) is correct.

The incorrectly spelled word is "tution." It should be "tuition."

86. Option (2) is correct.

Reporting the message of the speaker in the exact words as spoken by him is called direct speech. Reporting the message of the speaker in our own words is called indirect speech. The given sentence is in indirect speech. The correct conversion of the sentence to direct speech is: He said to me, "When did you book the flight tickets?"

87. Option (1) is correct.

This is a hypothetical sentence that is speculating on a future event. This is known as a type 1 conditional sentence. The structure of a type 1 conditional sentence is: if + simple present tense + clause II in simple future tense. Hence, the correct part will be: "This year it will reflect badly."

88. Option (1) is correct.

Toward and towards are prepositions that mean "in the direction of someone or something, or close in location or time." As prepositions, they are followed by nouns or noun phrases. Hence, options (3) and (4) are ruled out. With "towards," "to achieve" does not make sense.

89. Option (1) is correct.

Explanation: This question checks a student's vocabulary. "To walk aimlessly" is known as "amble." Hence, the correct answer is option (1). Crawl means to move forward on the hands and knees or by dragging the body close to the ground. Sprint means running at full speed over a short distance. Slither means to move smoothly over a surface with a twisting or oscillating motion.

90. Option (1) is correct.

This question checks a student's vocabulary. "Ostentatious" means "characterised by pretentious or showy display; designed to impress." Hence, the correct answer is option (1).

91. Option (2) is correct.

This question checks a student's knowledge of idioms and phrases. To say something in the same breath means to say two things that are so different that if one is true, the other must be false. Example: You say he treats you badly, but in the same breath, you tell me how much you love him!

92. Option (1) is correct.

The question tests one's vocabulary. "Raze" means to completely destroy (a building, town, or other settlement). Example: "Villages were razed to the ground." The antonym of "raze" is "build." Hence, the correct answer is option (1).

93. Option (2) is correct.

The question tests one's vocabulary. Retaliate means to make an attack in return for a similar attack. Example: "The blow stung, and she retaliated immediately." The synonym of "retaliate" is "react."

94. Option (4) is correct.

The definition of "avert" is to turn away (one's gaze or thoughts), to avoid. Example: "Talks failed to avert a rail strike."

95. Option (1) is correct.

In this particular sentence, a mention has been made of "no one," which makes the subject singular. If the subject is singular, the verb we use should also be singular. Replace 'were' with "was."

96. Option (1) is correct.

Since the paragraph is about the increased number of dolphins in Chilika Lake, the blank can be filled up with "population."

97. Option (2) is correct.

Since the paragraph is about the increase in the population of dolphins and goes on to explain the reason behind this the blank needs an adjective to qualify "fish enclosures." Unconstitutional means not in accordance with the political constitution or with procedural rules. "Illegitimate" means not authorised by the law; it is usually used for a child who is born to parents who are not married to each other. Unwarranted refers to something that is not justified or authorized. The best word to fill the blank is "illegal."

98. Option (4) is correct.

The former sentence talks about "illegal enclosure," and the best word to fill in the blank is "encroachment" because the sentence says that after the lake was made encroachment-free, the growth of dolphins increased. Trespassing means entering someone's land or property without permission. Confiscation means the action of taking or seizing someone's property with authority; seizure. Intervention means the action or process of intervening or interfering.

99. Option (2) is correct.

The sentence gives an additional reason for the increase in the growth of dolphins. Thus, the sentence should start with "moreover."

100. Option (1) is correct.

The paragraph enumerates the reasons for the growth of dolphins in Chilika Lake. The last line summed up the paragraph by saying that the lack of tourists made it suitable for dolphins to grow. The best word to fill the blank is "conducive," which means apt.