STAFF SELECTION COMMISSION

COMBINED GRADUATE LEVEL (TIER-I)

SOLVED PAPER

(20th April 2022: Shift-1)

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

General Intelligence and Reasoning

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

147 : 222 :: 158 : ?

1. 264 **2.** 225 **3.** 287 **4.** 233

2. 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. QPJ **2.** YXS **3.** SRM **4.** RQL

4. Select the correct option that indicates the arrangement of the given words in the order in which they appear in an English dictionary.

1. pediculate **2.** pandemonium
3. pancytopenia **4.** panelist
5. panegyric

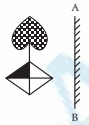
1. 1,3, 2, 5, 4 **2.** 3, 2, 5, 4, 1
3. 3, 2, 4, 5, 1 **4.** 2, 3, 5, 4, 1

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

LAS, NFW, MKD, OPH, LUS, ?

1. NZH **2.** MYX **3.** NZW **4.** MXW

5. Select the correct mirror image of the given figure when the mirror is placed at 'AB' as shown.



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

6. In a certain code language, 'FILE' is coded as 8357 and 'SINK' is coded as 9364. How will 'NIKE' be coded in that language?

1. 3647 **2.** 6473 **3.** 6347 **4.** 6437

7. 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 telephones are mobiles.
All mobiles are tablets.
Some tablets are laptops.

Conclusions:
I. Some mobiles are laptops.
II. All telephones are tablets.
III. Some telephones are tablets.

1. Only conclusion III follows.
2. Only conclusions I and II follow.
3. Only conclusion II follows.
4. All conclusions I, II and III follow.

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

9	7	9
5	4	7
43	26	?

1. 48 **2.** 61 **3.** 35 **4.** 29

9. Vinita and Amita are the sisters of Gaurav. Ashish is the father of Vinita. Ansh is the son of Amita. How is Ashish related to Ansh?

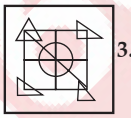
1. Maternal uncle **2.** Paternal grandfather
3. Paternal uncle **4.** Maternal grandfather

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

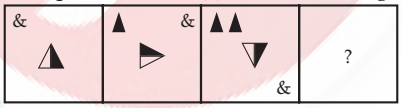
38, 53, 70, 89, ?

1. 92 **2.** 110 **3.** 124 **4.** 98

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

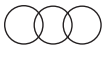
1.  **2.**  **3.**  **4.** 

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



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

13. Select the Venn diagram that best illustrates the relationship between the following classes. Plastic items, Buckets, Photo frames

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

14. Select the correct combination of mathematical signs that can sequentially replace the * signs and make the given equation correct.

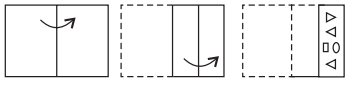
22 * 110 * 392 * 49 * 18 * 12

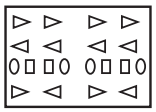
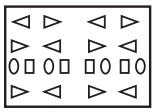
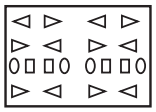
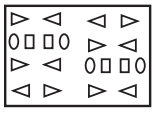
1. +, ÷, =, –, × **2.** +, =, ÷, ×, –
3. =, ×, +, ÷, – **4.** =, –, +, ÷, ×

15. Prakash, Qadir, Ramesh, Saurabh and Tariq are friends. Ramesh is taller than Qadir but shorter than Saurabh. Prakash is the shortest, and Tariq is taller than Saurabh. Who is the tallest among them?

1. Tariq **2.** Saurabh **3.** Qadir **4.** Ramesh

16. 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. 

17. Select the option that is related to the third term in the same way as the second term is related to the first term.
CARNATIC : SBDMZDJU :: FREEDOMS : ?
1. FSGVWTNP **2.** FSGVXPNP
3. FSGUNPEV **4.** GSFVWPEP

18. A cube of side 18 cm is painted yellow on all the faces and then cut smaller cubes of sides 3 cm each. Find the number of smaller cubes that have only two faces painted.
1. 36 **2.** 48 **3.** 20 **4.** 64

19. Which two signs need to be interchanged to make the following equation correct?
$189 \div 27 - 3 + 29 \times 2 = 48$
1. − and × **2.** − and + **3.** + and × **4.** ÷ and −

20. Select the number from among the given options that can replace the question mark (?) in the following series. 18, 34, 66, 130, ?
1. 273 **2.** 178 **3.** 232 **4.** 258

21. Select the combination of letters that, when sequentially placed in the blanks of the given series, will complete the series.
X _ U _ B _ O _ Z _ X _ U _ B
1. O X Z U B O Z **2.** O Z X U B Z O
3. O Z X B U O Z **4.** O Z X U B O Z

22. In a certain code language, 'Min Fin Dig Jig' means 'Radha is an artist' and 'Sic Ric Min Dig Fin' means 'An artist is always open-minded'. Which of the following is the code for 'Radha'?
1. Dig **2.** Fin **3.** Min **4.** Jig

23. The radius of a circle is 90 cm. If the radius of this circle is increased to 99 cm, then what will be the percentage increase in the area of this circle?
1. 22.5% **2.** 21% **3.** 25% **4.** 20%

24. In a certain code language, 'NORMAL' is written as 'DIPKRO' and 'SOUND' is written as 'GKRPX'. How will 'CLUSTER' be written in that language?
1. FBOOVQX **2.** BFOOVQX **3.** BFOVOXQ **4.** FOBOQVX

25. Vijendra walks a certain distance, say X metres. from his home towards the west. Then, he turns left and walks 23 metres. After that, he turns left and walks 36 metres. Then, he turns left again to walk 23 metres. He finally turns left and walks 18 metres to reach his home. Find the value of X.
1. 41 **2.** 18 **3.** 20 **4.** 22

General Awareness

26. Which of the following Articles of the Constitution of India deal with the right to equality?
1. 14 to 18 **2.** 25 to 28 **3.** 19 to 22 **4.** 23 to 24

27. In September 2020, Cabinet Committee on Economic Affairs (CCEA) approved increasing MSP of _____Rabi crops for the marketing season 2021–22.
1. two **2.** eight **3.** six **4.** four

28. Which of the following events in 2018 holds the Guinness World Record as being the largest annual fundraising event in the world (as of April 2021)?
1. Patagonian International Marathon
2. Schneider Electric Marathon de Paris
3. London Marathon **4.** Baxters Loch Ness Marathon

29. Which of the following Amendment Acts of the Constitution of India abolished the privy purses and privileges of former rulers of princely states?
1. 25th Amendment Act 1971 **2.** 26th Amendment Act 1971
3. 28th Amendment Act 1972 **4.** 27th Amendment Act 1971

30. In which of the following years did the Indian army free Goa from the Portuguese?
1. 1956 **2.** 1959 **3.** 1961 **4.** 1967

31. In order to prevent tooth decay safely and effectively by making use of water, it is subject to which of the following processes?
1. Iodisation **2.** Fluoridation
3. Carbonisation **4.** Chlorination

32. The scientific name for the domestic _____ is Canis lupus familiaris.
1. buffalo **2.** cat **3.** dog **4.** cow

33. A celt is _____ from the Neolithic period.
1. a tomb **2.** a house **3.** a tool **4.** an urn

34. The Northeast Canyons and Seamounts Marine National Monument is located in the _____.
1. Arctic Ocean **2.** Arabian Sea
3. Atlantic Ocean **4.** Red Sea

35. G.V. Mavalankar was the Chairman of the _____ of the Constituent Assembly of India.
1. Advisory Committee on Fundamental Rights, Minorities and Tribal and Excluded Areas
2. Committee on the Functions
3. Order of Business Committee
4. Ad hoc Committee on the National Flag

36. Who among the following was nominated for the 30th GD Birla Award for Scientific Research for his/her outstanding contribution to engineering science in April 2021?
1. Chandrima Saha **2.** Suman Chakraborty
3. Sanjay Mittal **4.** Rajeev Kumar Varshney

37. Who among the following was appointed as the brand ambassador of Eat. fit in March 2021?
1. Devdutt Padikkal **2.** Virat Kohli
3. Deepika Padukone **4.** Sonu Sood

38. Which of the following does not belong to 'Kingdom Fungi'?
1. Aspergillus **2.** Rhizopus **3.** Mucor **4.** Euglena

39. The Swachh Swasth _____ is an initiative to achieve better health outcomes through improved sanitation, increased awareness and healthy lifestyles.
1. Samagra **2.** Sansara **3.** Sarvatra **4.** Swarga

40. As described in 'Ain-i-Akbari' by Abul Fazl-i-Allami, 'gaz' (unit of measuring length) was divided into equal parts called_____ .
1. tassuj **2.** liksha **3.** rajahkan **4.** angul

41. In March 2021, Bhavani Devi became the first Indian _____ to qualify for the Olympics.
1. fencer **2.** golfer **3.** boxer **4.** swimmer

42. Sikandra is the final resting place of Emperor _____.
1. Jahangir **2.** Shah Jahan **3.** Akbar **4.** Humayun

43. Prashant Bhushan, who was a founding member of the India Against Corruption movement, is a prominent Indian _____.
1. film director **2.** sports commentator
3. lawyer **4.** industrialist

44. _____ is a popular folk dance of Minicoy Island.
1. Leshalaptu **2.** Aaluyattu **3.** Lava **4.** Moyashai

45. As per an estimate by the 'Food Waste Index Report 2021', released by the United Nations Environment Programme (UNEP) in March 2021, India wastes approximately _____ kg food per person per year.
1. 25 **2.** 100 **3.** 50 **4.** 20

46. Koteshwar Hydroelectric Power Project is located on the river _____ .
1. Damodar **2.** Bhagirathi **3.** Gomti **4.** Koshi

47. Which of the following is the main food crop of the semi-arid areas of Central and Southern India?
1. Jowar **2.** Maize **3.** Bajra **4.** Ragi

48. The National Rail Plan announced in the Union Budget of 2021–22 aims to create a future-ready railway system by which of the following years?
1. 2024 **2.** 2030 **3.** 2025 **4.** 2029

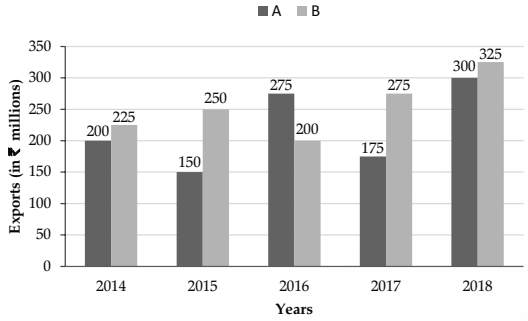
49. The Union Budget 2021–22 has recommended a voluntary scrapping policy for vehicles based on fitness tests after a period of _____ years for personal vehicles.
1. 10 **2.** 20 **3.** 15 **4.** 25

50. Participation in which of the following activities is not recommended for the motor development of a student?
1. Playing cricket **2.** Joining a dance class
3. Attending Yoga sessions
4. Helping the visually challenged

Quantitative Aptitude

51. The tops of two poles of heights 18 m and 30.5 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, what is the length (in m) of the wire?
1. 20 **2.** 25 **3.** 28 **4.** 36

52. Study the given bar graph and answer the question that follows.
The bar graph shows the exports of cars of type A and B(in ₹millions) from 2014 to 2018.

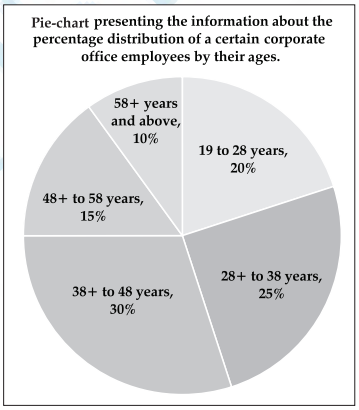


The total exports of cars of type A from 2014 to 2016 is approximately what percentage less than the total exports of cars of type B from 2015 to 2017 (correct to one decimal place)?
1. 10.4% **2.** 11.7% **3.** 11.3% **4.** 13.8%

53. Simplify the following expression:
$\text{cosec}^4 A(1 - \cos^4 A) - 2\cot^2 A - 1$
1. $\sin^2 A$ **2.** $\text{cosec}^2 A$ **3.** 1 **4.** 0

54. The average of eleven consecutive positive integers is *d*. If the last two numbers are excluded, by how much will the average increase or decrease?
1. Will decrease by 1 **2.** Will increase by 2
3. Will decrease by 2 **4.** Will increase by 1

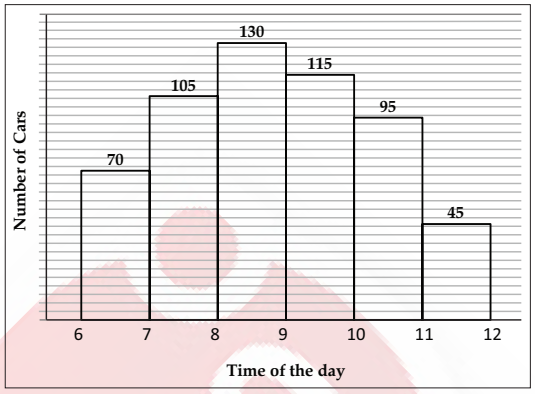
55. The following pie chart shows the distribution of percentage of a certain corporate office employees in various age groups.
A total number of employees of the corporate office = 2,500. Study the pie chart carefully and answer the question that follows.
The number of the corporate office employees of age group of 38+ years and above is how much percentage more than that of 28+ to 38 years?



1. 80% **2.** 150% **3.** 120% **4.** 20%

56. If 6 tan A (tan A + 1) = 5 – tan A, given that $0 < A < \frac{\pi}{2}$ what is the value of (sin A + cos A)?
1. $3\sqrt{5}$ **2.** $\frac{5}{\sqrt{3}}$ **3.** $5\sqrt{3}$ **4.** $\frac{3}{\sqrt{5}}$

57. The number of cars passing the road near a colony from 6 a.m. to 12 noon has been shown in the following histogram.
What is the minimum change percentage in the number of cars in comparison to the previous hour? (correct to two decimal places)



1. 10.52% **2.** 11.54% **3.** 23.81% **4.** 15.25%

58. Points A and B are on a circle with centre O. PA and PB are tangents to the circle from an external point P. If PA and PB are inclined to each other at 42°, then find the measure of ∠OAE
1. 42° **2.** 21° **3.** 69° **4.** 25°

59. A college hostel mess has provisions for 25 days for 350 boys. At the end of 10 days, when some boys were shifted to another hostel, it was found that now the provisions will last for 21 more days. How many boys were shifted to another hostel?
1. 92 **2.** 110 **3.** 92 **4.** 100

60. If $\left(0.4x + \frac{1}{x}\right) = 5$, what is the value of $\left(0.06x^3 + \frac{1}{x^3}\right)$?
1. 125 **2.** 110 **3.** 119 **4.** 105

61. Manjeet bought a second-hand motorbike for ₹22,000 and spent ₹3,000 on its overhauling and maintenance. He then sold it with 12% profit. If he had sold it for ₹500 less, then what would have been his profit percentage?
1. 10.5% **2.** 10% **3.** 5% **4.** 8%

62. The difference between compound interest compounded annually and simple interest on a certain sum at a rate of 15% per annum for 2 years is ₹1,944. Find the compound interest compounded annually (in ₹) on the same sum for the same period at a rate of 10% per annum.
1. 27,216 **2.** 18,060 **3.** 18,144 **4.** 20,500

63. A shopkeeper allows a 28% discount on the marked price of an article and still makes a profit of 20%. If he gains ₹30.80 on the sale of one article, then what is the selling price (in ₹) of the article?
1. 184.80 **2.** 174.80 **3.** 164.30 **4.** 154.00

64. The inner circumference of a circular path enclosed between two concentric circles is 264 m. The uniform width of the circular path is 3 m. What is the area (in m^2, to the nearest whole number) of the path? $\left(\text{Take } \pi = \frac{22}{7}\right)$
1. 696 **2.** 756 **3.** 820 **4.** 948

65. A triangle with the lengths of its sides proportional to the numbers 7, 24 and 30 is:
1. acute angled **2.** obtuse angled
3. not possible **4.** right angled

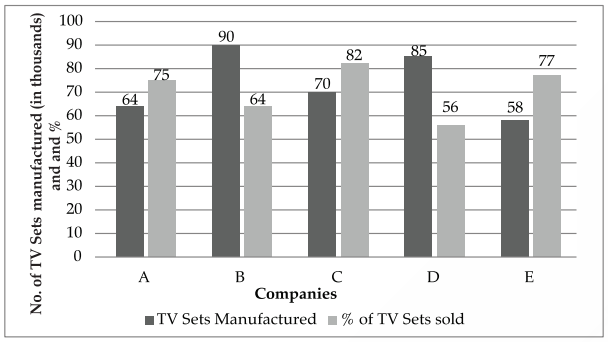
66. 80% and 90% pure acid solutions are mixed to obtain 20 litres of 87% pure acid solution. Find the quantity (in litres) of 80% pure acid solution taken to form the mixture.
1. 4 **2.** 8 **3.** 6 **4.** 9

67. In a circle with centre O, PA and PB are tangents to the circle at point A and point B, respectively. C is a point on the major are AB. If $\angle ACB = 50°$, then find the measure of $\angle APB$.
1. 100° **2.** 90° **3.** 80° **4.** 50°

68. In a right triangle ABC, right angled at B, altitude BD is drawn to the hypotenuse AC of the triangle. If AD = 6 cm, CD = 5 cm, then find the value of $AB^2 - BD^2$ (in cm).
1. 30 **2.** 96 **3.** 36 **4.** 66

69. Numbers A and B are 0% and 50%, respectively, more than the number C. The ratio of A to that of B is:
1. 4 : 5 **2.** 13 : 15 **3.** 15 : 13 **4.** 5 : 4

70. The given bar chart represents the number of Television Sets (TV) manufactured (in thousands) and the respective percentage of those TV Sets sold by five different companies A, B, C, D and E in 2015.
Study the chart carefully and answer the question that follows.



The average number of TV Sets solid by companies C and D is what percentage of the number of TV Sets manufactured by company E? Express your answer correct to one place of decimal.
1. 86.5% **2.** 92.2% **3.** 90.5% **4.** 89.1%

71. If $x^2 + \frac{1}{x^2} = 18$, $x > 0$, then find the value of $x^3 + \frac{1}{x^3}$.
1. 52 **2.** $17\sqrt{5}$ **3.** $34\sqrt{5}$ **4.** $46\sqrt{5}$

72. The value of:
$[25 + 8 \div 2 - \{16 + (14 \text{ of } 7 \div 14) - (18 \div 12 \text{ of } \frac{1}{2})\}] = ?$
1. 12 **2.** 6 **3.** 9 **4.** 3

73. Find the value of k in the number 3426k if the number is divisible by 6 but NOT divisible by 5.
1. 4 **2.** 6 **3.** 3 **4.** 9

74. Ram travelled from a place Z to P at an average speed of 130 km/h. He travelled the first 75% of the distance in two-third of the time and the rest at an average speed of x km/h. The value of $\frac{x}{2}$ is:
1. 51 **2.** 48.75 **3.** 97.5 **4.** 19.25

75. What is the least square number which is exactly divisible by 2, 3, 10, 18 and 20?
1. 900 **2.** 180 **3.** 196 **4.** 30

English Comprehension

76. Identify the segment in the sentence which contains a grammatical error.
My friends are gone on a trip to Goa today.
1. My friends **2.** are gone
3. on a trip **4.** to Goa today

77. 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'.
As I am hearing the lecture, it reminded me of a book I had read two years ago.
1. As I have heard **2.** When I hear
3. As I heard **4.** No Substitution required

78. Select the most appropriate ANTONYM of the given word.
Brittle
1. Frail **2.** Fragile **3.** Durable **4.** Crumbling

79. Select the most appropriate meaning of the given idiom.
Smooth sailing
1. Easy progress **2.** Calm weather
3. Comfortable place **4.** Plain dress

80. Select the option that expresses the given sentence in passive voice.
Ask him to leave the room.
1. He should be ask to leave the room.
2. He should be asked to leave the room.
3. He should be asking to leave the room.
4. He should have been asked to leave the room.

81. 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.
Sunil refused to / attend the meeting / of association on Saturday.
1. No error **2.** Sunil refused to
3. of association on Saturday
4. attend the meeting

82. Select the most appropriate synonym of the given word.
Saucy
1. Tasty **2.** Polite **3.** Smooth **4.** Cheeky

83. Select the most appropriate ANTONYM of the given word.
Pliable
1. Even **2.** Smooth **3.** Bending **4.** Rigid

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.
This hall is / badly to need / of repair.
1. badly to need **2.** No error
3. This hall is **4.** of repair

85. Select the option that can be used as a one-word substitute for the given group of words.
Easily hurt emotionally
1. Senseless **2.** Sensible **3.** Incensed **4.** Sensitive

86. Identify the segment in the sentence which contains the grammatical error.
Alex picked up the boxes quite easily even they were heavy.
1. the boxes **2.** quite easily
3. even they were heavy **4.** Alex picked up

87. 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'.
This is one of the most remarkable cases **of all others.**
1. No Substitution required **2.** of all
3. of other all **4.** all of others

88. Select the most appropriate option to fill in the blank.
The latest _____ I have bought is a dishwasher.
1. apparatus **2.** implement **3.** gadget **4.** tool

89. Given below are four sentences which are jumbled. Pick the option that gives their correct order.
A. The sectors included agriculture, public health and public utilities among others.

B. The GGI framework covered 10 sectors and 58 Industries.
C. The Good Governance Index (GGI) 2021 scores have been declared.
D. The objective was to provide quantifiable data to compare the performance of different States and Union Territories in these sectors.
1. CADB **2.** CBAD **3.** ABDC **4.** BACD

90. Select the option that can be used as a one-word substitute for the given group of words.
A group of people
1. Crowd **2.** Herd **3.** Flock **4.** Brood

91. Select the most appropriate synonym of the given word.
Robust
1. Sturdy **2.** Small **3.** Round **4.** Weak

92. Select the option that expresses the given sentence in passive voice.
She is holding free classes for the poor.
1. Free classes are being held by the poor for her.
2. The poor are holding free classes for her.
3. Free classes are being held for the poor by her.
4. Free classes have been held for the poor by her.

93. Select the INCORRECTLY spelt word.
1. Necessary **2.** Beginning **3.** Irrelevant **4.** Location

94. Select the most appropriate meaning of the given idiom.
On purpose
1. Intentionally **2.** Accidently
3. Luckily **4.** Mischievously

95. Select the option that expresses the given sentence in indirect speech.
She said to him, "May God shower His choicest blessings on you!"
1. She wished that God may shower His choicest blessings on you.
2. She wished that may God shower your choicest blessings on Him.
3. She wished that God might shower His choicest blessings on you.
4. She wished that God might shower His choicest blessings on him.

In the following passage some words have been deleted. Fill in the blanks with the help of the alternatives given. Select the most appropriate option for each number.
I decided to stay away from television (1) _____ a whole year. After a week, I started feeling (2) _____. But, my friend Bess cheered me up. She (3) _____ me every day and would take me places. It was (4) _____ how much fun we had without TV. My life had become more (5) _____ without the good old idiot box.

96. Select the most appropriate option to fill in the blank number 1.
1. for **2.** to **3.** since **4.** from

97. Select the most appropriate option to fill in the blank number 2
1. depressed **2.** devoted **3.** delighted **4.** deceived

98. Select the most appropriate option to fill in the blank number 3
1. thanked **2.** requested **3.** encouraged **4.** attended

99. Select the most appropriate option to fill in the blank number 4
1. unbelievable **2.** unhealthy
3. unlucky **4.** unlimited

100. Select the most appropriate option to fill in the blank number 5
1. certain **2.** exciting **3.** boring **4.** popular

Answer Key

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

Answers with Explanations

General Intelligence and Reasoning

1. Option (4) is correct.
Explanation: Given series is as follows:
147 : 222 :: 158 : ?
Logic is as follows:

2. Option (1) 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

Q -1 gives →	P -6 →	J
17	16	10

Y -1 gives →	X -5 →	S
25	24	19

R -1 gives	Q	-5	L
18	17		12

S -1 gives	R	-5	M
19	18		13

3. **Option (2) is correct.**
Explanation:
As per the dictionary, the given words can be arranged as:

Pancytopenia	Pandemonium	Panegyric	Panelist	Pediculate

4. **Option (3) is correct.**
Explanation: Given series is as follows:
LAS, NFW, MKD, OPH, LUS, ?
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,

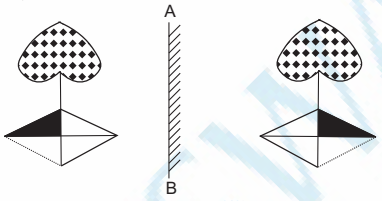
L +2 gives	N	-1	M	+2	O	-3	L	+2	N
12	14		13		15		12		14

A +5 gives	F	+5	K	+5	P	+5	U	+5	Z
1	6		11		16		21		26

S +4 gives	W	+7	D	+4	H	+11	S	+4	W
19	23		4		8		19		23

Hence, NZW is the correct answer.

5. **Option (2) is correct.**
Explanation:
Logic:
In the mirror image, the left becomes right and the right becomes left.
Therefore,



6. **Option (3) is correct.**
Explanation: Given that:
'FILE' is coded as 8357

F	I	L	E
8	3	5	7

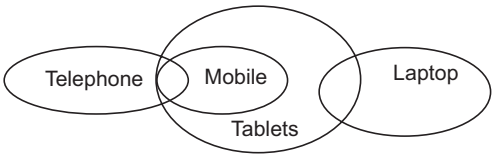
'SINK' is coded as 9364

S	I	N	K
9	3	6	4

Similarly,
'NIKE' will be coded as

N	I	K	E
6	3	4	7

7. **Option (1) is correct.**
Explanation:



(1) As all mobiles are tablets and some tablets are laptops. So, "some mobiles are laptops" is possible but not definitely true.
(2) As "some telephones are mobiles" "all mobiles are tablets" and "some tablets are laptops". So, all telephones being tablets are a possibility but not definitely true.
(3) As "some telephones are mobiles" "all mobiles are tablets". So, "some telephones are tablets" is definitely true. Hence, only conclusion III follows.

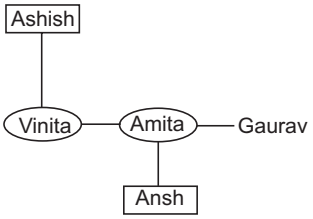
8. **Option (2) is correct.**
Explanation: Given that:
9 7 9
5 4 7
43 26 ?
The logic follows here:
(1st number × 2nd number) – 2 = 3rd number
Column wise,
Column 1 → (9 × 5) – 2 = 43
Column 2 → (7 × 4) – 2 = 26
Similarly,
Column 3 → (9 × 7) – 2 = 61

9. **Option (4) is correct.**
Explanation:
Preparing the family using the following symbols:

Symbol in Diagram	Meaning
◯	Female
□	Male
=	Married couple
—	Siblings
|	Difference of a Generation

Now, according to the question,
(1) Vinita and Amita are the sisters of Gaurav

(2) Ashish is the father of Vinita. Ansh is the son of Amita.

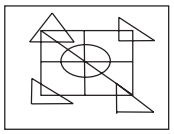


Clearly, Ashish is the maternal grandfather of Ansh.

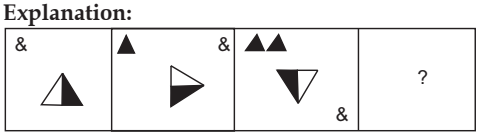
10. **Option (2) is correct.**
Explanation: Given series is as follows:
38, 53, 70, 89, ?

38	+15	53	+17	70	+19	89	+21	110

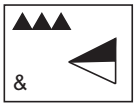
11. Option (2) is correct.
Explanation:
Logic:
Find the figure embedded from the options figure without rotation is:



12. Option (4) is correct.
Explanation:



Logic:
'&' is moving a complete step in the clockwise direction, and 'smaller triangles' are added when the 'bigger triangle' in the centre is moving clockwise at angle of 90 degree in each step.
Hence, the required figure is



13. Option (4) is correct.
Explanation:

14. 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.
22 * 110 * 392 * 49 * 18 * 12
(1) +, ÷, =, –, ×

$$22 + 110 \div 392 = 49 - 18 \times 12$$
$$22 + 0.280 = 49 - 288$$
$$22.28 \neq -239$$

(2) +, =, ÷, ×, –

$$22 + 110 = 392 \div 49 \times 18 - 12$$
$$132 = 8 \times 18 - 12$$
$$132 = 144 - 12$$
$$132 = 132$$
$$\text{LHS} = \text{RHS}$$

(3) =, –, +, ÷, ×

$$22 = 110 - 392 + 49 \div 18 \times 12$$
$$22 = 110 - 392 + 2.722 \times 12$$
$$22 = 110 - 392 + 32.664$$
$$22 = 142.664 - 392$$
$$22 \neq -249.33$$

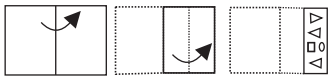
(4) =, ×, +, ÷, –

$$22 = 110 \times 392 + 49 \div 18 - 12$$
$$22 = 110 \times 392 + 2.722 - 12$$
$$22 = 43120 + 2.722 - 12$$
$$22 = 43122.722 - 12$$
$$22 \neq 43110.722$$

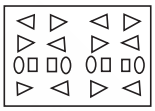
Hence, the correct answer is +, =, ÷, ×, –

15. Option (1) is correct.
Explanation:
Five friends: Prakash, Qadir, Ramesh, Saurabh, and Tariq are friends.
Ramesh is taller than Qadir but shorter than Saurabh.
Hence,
∴ Saurabh > Ramesh > Qadir
Prakash is the shortest, and Tariq is taller than Saurabh.
Hence, Tariq > Saurabh > Ramesh > Qadir > Prakash
Clearly, Tariq is the tallest among them.

16. Option (3) is correct.
Explanation:



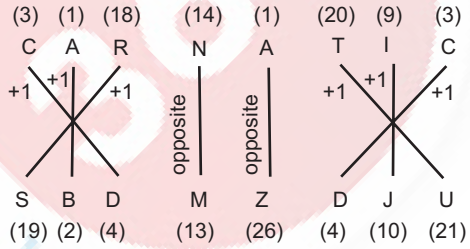
Logic of symmetry will be followed here



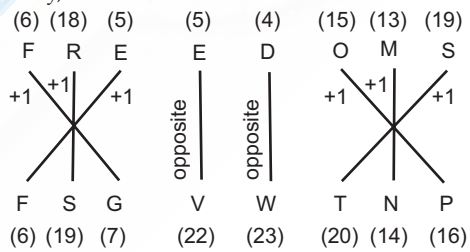
17. Option (1) is correct.
Explanation:
Table of alphabetical series (point to remember)

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

As, CARNATIC: SBDMZDJU



Similarly,



18. Option (2) is correct.
Explanation:
Cube is divided into 18/3 =6 equal parts, hence, $n = 6$
Number of cubes with 2 sides painted $= 12(n - 2)$

$$= 12 \times (6 - 2)$$
$$= 12 \times 4 = 48$$

19. Option (1) is correct.
Explanation:

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

189 ÷ 27 − 3 + 29 × 2 = 48

(1) – and ×

LHS = 189 ÷ 27 × 3 + 29 – 2
= 7 × 3 + 29 – 2
= 21 + 29 – 2 = 50 – 2 = 48 = RHS

(2) – and +

LHS = 189 ÷ 27 + 3 – 29 × 2
= 7 + 3 – 58
= 10 – 58 = – 48 ≠ RHS

(3) + and ×

LHS = 189 ÷ 27 – 3 × 29 + 2
= 7 – 3 × 29 + 2
= 7 – 87 + 2 = 9 – 87= –78 ≠ RHS

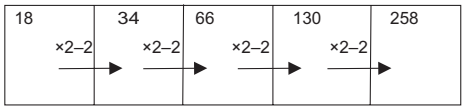
(4) ÷ and –

LHS = 189 – 27 ÷ 3 + 29 × 2
= 189 – 7 + 58
= 247 – 7 = 240 ≠ RHS

20. Option (4) is correct.

Explanation: Given series:

18, 34, 66, 130, ?



21. Option (4) is correct.

Explanation: Given series:

X _ U _ B _ O _ Z _ X _ U _ B

Logic:

Count the number of elements in the series, i.e., 15.

Now, make factors of 15, i.e., 5 and 3.

Now, divide it into group of 5 elements.

X OU Z B /XO U Z B/X O U Z B

22. Option (4) is correct.

Explanation:

The logic followed here:

Min Fin Dig Jig → Radha is an artist

Sic Ric Min Dic Fin → A artist is always open-minded

Clearly, the code for Radha is Jig.

23. Option (2) is correct.

Explanation:

The radius of the circle = 90 cm

The new radius of the circle = 99 cm

Increase in area $= \pi R^2 - \pi r^2$
$= \pi[(99)^2 - (90)^2]$
$= \pi \times 9 \times 189 = 1701\pi$

Now,

$$\% \text{ Increase in area} = \frac{\text{increase in area}}{\text{original area}} \times 100$$

$$\% \text{ Increase in area} = \frac{1701\pi}{\pi \times 90 \times 90} \times 100 = 21\%$$

24. Option (1) 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, according to the question

N	O	R	M	A	L
14	15	18	13	1	12

Arranging the above letters "N O R M A L" in increasing order of the alphabetical series we get "A L M O N R".

A	L	M	N	O	R
1	12	13	14	15	18
	+3	–3	+3	–3	+3	–3
D	I	P	K	R	O
4	9	16	11	18	15

Similarly,

S	O	U	N	D
19	15	21	14	4

Arranging the above letters "S O U N D" in increasing order of the alphabetical series, we get "D N O S U".

D	N	O	S	U
4	14	15	19	21
	+3	–3	+3	–3	+3
G	K	R	P	X
7	11	18	16	25

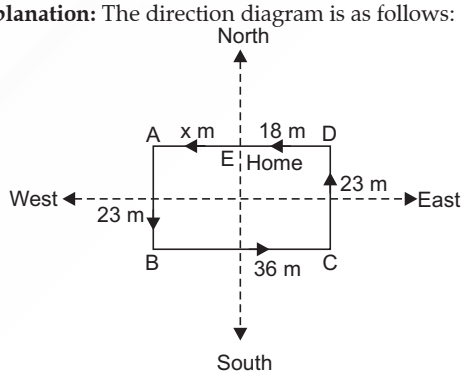
C	L	U	S	T	E	R
3	12	21	19	20	5	18

Arranging in increasing order.

C	E	L	R	S	T	U
3	5	12	18	19	20	21
	+3	–3	+3	–3	+3	–3	+3
F	B	O	O	V	Q	X
6	2	15	15	22	17	24

25. Option (2) is correct.

Explanation: The direction diagram is as follows:



Therefore, BC – ED = 36 m – 18 m = 18 m

General Awareness

26. Option (1) is correct.

Articles 14 to 18 of the Constitution of India deals with the right to equality.

Article 14 – The State shall not deny to any person equality before the law or the equal protection of the laws within the territory of India, on grounds of religion, race, caste, sex or place of birth.

Article 15 – The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them.

Article 16 – There shall be equality of opportunity for all citizens in matters relating to employment or appointment to any office under the State.

Article 17 – Abolition of untouchability.

Article 18 – Abolition of all titles except military and academic.

The Indian Constitution provides fundamental rights in six broad categories which are covered enshrined in Part III (Article 12–32) of Indian Constitution.

27. Option (3) is correct.

In September 2020, Cabinet Committee on Economic Affairs (CCEA) approved increasing MSP of six Rabi crops for the marketing season 2021–22. MSP stands for Minimum Support Price. MSP is the minimum price government pays to the farmers for their agricultural produce if the government buys the produce. This price is set by the government twice a year and the Commission for Agricultural Costs and Prices (CACP) recommends the MSP of crops. The concept was started for the first time in the year 1966–67 for the wheat crop.

Rabi crops are sown around the retreating monsoon and northeast monsoon season and the harvest of these crops is done in summer. These are also known as winter crops. Examples of these crops are gram, wheat, peas and barley.

28. Option (3) is correct.

London Marathon holds the Guinness World Record as being the largest annual fundraising event in the world (as of April 2021).

London Marathon began in the year 1981, since then the event has raised more than £1 billion for charity.

29. Option (2) is correct.

26th Amendment Act 1971 of the Constitution of India abolished the privy purses and privileges of former rulers of princely states. Privy Purses referred to the special status that the princely states enjoyed. This amendment was moved by the then Prime Minister Mrs. Indira Gandhi and led to the omission of Articles 291 and 362 of the Indian Constitution. Article 291 dealt with Privy purse sums of rulers and article 362 dealt with rights and privileges of rulers of the Indian states.

30. Option (3) is correct.

The Indian army freed Goa from the Portuguese in 1961. An island of Goa, now known as Tiswadi taluka was captured by Portuguese conquistadore Afonso de Albuquerque in 1510. Portuguese ruled Goa for almost 450 years. Indian armed forces liberated Goa from their rule under the operation named 'Operation Vijay.' Under this operation, there was a 36 hours land, sea and air strike for over 36 hours. It was India's first Tri-Service 'Integrated' operation. Goa was liberated from Portuguese rule on 19 December 1961.

31. Option (2) is correct.

In order to prevent tooth decay safely and effectively by making use of water, it is subject to fluoridation. Fluoride is required to rebuild and strengthen the tooth's outer layer, enamel. The fluoridation of water prevents the tooth decay as there is frequent and consistent contact with the tooth. It also prevents the build up of cavities and also enable the rebuilding of tooth's surface.

32. Option (3) is correct.

The scientific name for the domestic dog is *Canis lupus* familiaris. Dog belongs to order Carnivora and is a domestic mammal of the family Canidae.

The scientific name for buffalo is *Bubalus bubalis*. They belong to Bovidae family and are of order Artiodactyla. They are herbivores that are domesticated and used for dairy purpose to provide milk.

The scientific name for cat is *Felis catus*. It is a domesticated species of small carnivores cat belonging to order Carnivora and class Mammalia.

The scientific name of the cow is "*Bos taurus*". It is a domesticated animal raised for leather, milk and meat. It is used to pull carts or plough agricultural fields.

Scientific name is the binomial nomenclature which consists of two parts, both of which are derived from Latin. The first part is the generic name that highlights the genus to which organisms belong. The second part is the specific name that identifies exact species under which the organisms fall.

33. Option (3) is correct.

A celt is a tool from the Neolithic period. Celt is a polished stone. The Neolithic period is the last stage of the Stone Age. The stone age is covered in three different periods– Palaeolithic, Mesolithic, and Neolithic. Neolithic age is known for the use of polished stones for weapons and spread of agricultural practices. In this age, cereal cultivation and animal domestication were introduced. In the end of Neolithic era, copper metallurgy was introduced. Pottery first appeared during the Neolithic age. Neolithic era led to the Bronze Age (Chalcolithic or Eneolithic Era).

34. Option (3) is correct.

The Northeast Canyons and Seamounts Marine National Monument is the first marine National monument of the United States created by the US President Barack Obama on 15 September 2016. It is located within New England and mid-Atlantic regions and comprises a total area of 4,913 square miles. It is a house to four underwater seamounts and three submarine canyons, along with some endangered whales, deep sea corals, and sea turtles. It is the only marine monument in Atlantic Ocean.

Arctic Ocean is the smallest, shallowest, and coldest oceans of the world. It covers an area of 4,060,000 sq. km. It is surrounded by Eurasia and North America.

35. Option (2) is correct.

G.V. Mavalankar was the Chairman of the Committee on the Functions of the Constituent Assembly of India. The chairman of following committees are as under

- Advisory Committee on Fundamental Rights–Vallabhbhai Patel
- Fundamental Rights Sub-Committee–J.B. Kripalani
- Committee on Minorities and Tribal and Excluded Areas–Vallabhai Patel
- Order of Business Committee–KM Munshi
- Ad hoc Committee on the National Flag–Rajendra Prasad
- Committee on the Rules of Procedure–Rajendra Prasad
- Drafting Committee–BR Ambedkar

36. Option (2) is correct.

Suman Chakraborty was nominated for the 30th GD Birla Award for Scientific Research for his/her outstanding contribution to engineering science in April 2021. This award recognises eminent Indian scientists below the age of 50 for their original and outstanding contributions to any branch of science. It carries a prize of 50 lakhs and was created in 1991.

37. Option (1) is correct.

Devdutt Padikkal was appointed as the brand ambassador of Eat. fit in March 2021.

38. Option (4) is correct.

Euglena does not belong to 'Kingdom Fungi'. It belongs to the Kingdom Protista. These are single celled organisms with characteristics of both animals and plants. They have a well-defined nucleus. It uses flagella for locomotion and are found in freshwater, saltwater, marshes and also in moist soil.

Mucor is a fungal plant pathogen belonging to Mucoraceae family and Mucor genus. It is also known as common pinmould.

Aspergillus is a genus with several mold species.

Rhizopus is a genus of common saprophytic fungi on plants and specialized parasites on animals. These are found in moist places and on organic substances like vegetables, fruits, bread, jellies, etc.

39. Option (3) is correct.

The Swachh Swasth Sarvatra is an initiative to achieve better health outcomes through improved sanitation, increased awareness and healthy lifestyles. It is a joint initiative of Ministry of Health and Family Welfare (MoHFW) and the Ministry of Drinking Water and Sanitation (MDWS) under the Swacch Bharat Mission. The objective of this initiative is to strengthen community health centres in blocks across the country to enable them to achieve higher levels of cleanliness and hygiene. Under this program, a financial assistance of 10 lakh rupees will be given to the community health centres so that they can be strengthened to meet the standards of sanitation, hygiene and infection control.

40. Option (1) is correct.

As described in 'Ain-i-Akbari' by Abul Fazl-i-Allami, 'gaz' (unit of measuring length) was divided into equal parts called tassuj. Each 'gaz' was divided into 24 equal parts. This system of measurement was used in the medieval period to measure

land pieces for the purpose of construction. Gaz was used till the year 1956 in which.

'Ain-i-Akbari' is the third part of 'Akbar Nama'. It was written by Abu'l Fazl in Persian language and was started in 1589.

41. Option (1) is correct.

In March 2021, Bhavani Devi became the first Indian fencer to qualify for the Olympics. She is an Indian sabre fencer. She is supported by GoSports Foundation through the Rahul Dravid Athlete Mentorship Programme.

42. Option (3) is correct.

Sikandra is the final resting place of Emperor Akbar. This monument is supposed to be started to be built by Emperor Akbar himself and the construction was completed by Jahangir. It is situated in Sikandra, Agra and is an outstanding example of Mughal architecture.

The resting place of Jahangir is known as tomb of Jahangir and is in Shahdra, Lahore, Pakistan. It is located on the banks of Ravi river.

The resting place of Humayun is known as Humayun's Tomb and is in Delhi, India. It was built in 1570. It was declared a UNESCO World Heritage Site in 1993.

The resting place of Shah Jahan is Taj Mahal, Agra, India. It was designated as a UNESCO World Heritage Site in 1983 and was commissioned by Shah Jahan in 1631 in the memory of his wife Mumtaz Mahal.

43. Option (3) is correct.

Prashant Bhushan, who was a founding member of the India Against Corruption movement, is a prominent Indian lawyer. He is a public interest lawyer in the Supreme Court of India. India Against Corruption was known as Team Anna.

44. Option (3) is correct.

Lava is a popular folk dance of Minicoy Island of Lakshadweep. It is a popular traditional folk dance performed in circle by the male members on the beat of roaring drums. They have colourful costumes, and a headgear known as 'Bolufeyle'.

Leshalaptu is a folk dance of Nagaland and is performed by women.

Moyashai is a victory dance performed by Lotha tribe of Nagaland.

Aaluyattu is a folk dance performed by the Konyak tribe.

45. Option (3) is correct.

As per an estimate by the 'Food Waste Index Report 2021', released by the United Nations Environment Programme (UNEP) in March 2021, India wastes approximately 50 per kg food per person per year. The Food Waste Index is an initiative to support the United Nations Sustainable Development Goal 12.3.

The UNEP is headquartered in Nairobi, Kenya and was formed on 5 June 1972. The World Hunger Day is observed on 28 May.

46. Option (2) is correct.

Koteshwar Hydroelectric Power Project is located on the river Bhagirathi. It is a part of Tehri Hydro-power complex and its purpose is to regulate the dam's tailrace for irrigation and create the lower reservoir of the Tehri Pumped Storage Power Station.

Bhagirathi river is one of the two headstreams of Ganges river and is considered as the source of the river.

Damodar river is also known as sorrow of Bengal and it flows through West Bengal and Jharkhand. The four dams on Damodar river are Tilaiya, Konar, Maithon and Panchet hill dam.

Gomti river is a tributary of the river Ganges and originates in Pilibhit, Uttar Pradesh.

Kosi river flows through India, Nepal and China. It is a 720 km long transboundary river and is known as Saptakoshi for its seven tributaries.

47. Option (1) is correct.

Jowar is the main food crop of the semi-arid areas of central and southern India. Jowar is also known as Sorghum and falls in the category of both Rabi and kharif crops in South India. Maharashtra is the major producer of this crop followed by Karnataka, Madhya Pradesh, Andhra Pradesh and Telangana. A food crop is the crop grown for human consumption.

Ragi is also known as finger millet and is a kharif food crop. It is a dry land crop grown in tropical and sub-tropical regions. It is a rich source of calcium, iron, protein, fiber and other minerals. Karnataka is a major producer of ragi along with Andhra Pradesh, Tamil Nadu, and Kerala.

Maize is the third most important food crop after rice and wheat. Karnataka, Madhya Pradesh and Bihar are the major maize producing states of India. Globally, it is known as queen of cereals because of its highest genetic yield potential. Also, it is an important industrial raw material and provides large opportunity for value addition.

Bajra is a Kharif crop grown in warm and dry climate. It is also known as pearl millet and is the most widely grown millet in India. Rajasthan is the major Bajra producing state followed by Uttar Pradesh and Haryana.

48. Option (2) is correct.

The National Rail Plan announced in the Union Budget of 2021–22 aims to create a future ready railway system by 2030. It is aimed to formulate strategies based on both operational capacities and commercial policy initiatives to increase modal share of the Railways in freight to 45%.

The current Union Railways Minister is Ashwini Vaishnaw.

49. Option (2) is correct.

The Union Budget 2021–22 has recommended a voluntary scrapping policy for vehicles based on fitness tests after a period of 20 years for personal vehicles and 15 years for commercial vehicles. The fitness test will be conducted at automated fitness centres and the cost of each fitness test will be around ₹ 40,000. This will be additional to road and Green tax that the owner would have to pay after reviewing the registration after a 15-year period. The fitness test will remain valid for a period of 5 years.

It was implemented from 1 April 2022.

This will help in encouraging fuel efficiency, environment friendly vehicles, and thereby reducing vehicular pollution. It will ultimately bring down the oil import bill.

50. Option (4) is correct.

Helping the visually challenged person will not help in the development of motor skills of a student. Motor development is related to growth and strengthening of bones and muscles. It is one's ability to move and touch the surroundings. Motor development can be divided into two categories of fine and gross motor skills.

Fine motor skills refer to the small movement involving small muscles of eyes, hands and wrists. These skills are required to complete everyday tasks and these movements tend to come naturally. They are important for growth of intelligence in human beings.

Gross motor skills are the physical skills that involve the large muscles of human body to perform everyday actives such as standing, walking, sitting, running, etc. These involve immense eye hand coordination.

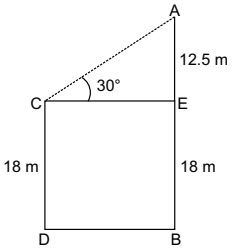
Quantitative Aptitude

51. Option (2) is correct.

Tops of two poles of heights 18 m and 30.5 m are connected by a wire.

The wire makes an angle of 30° with the ground.

Let us make a figure based on this.



Let us assume that AB and CD be the towers of heights 30.5 and 18 m, respectively and AC be the wire.

Here, $CD = EB = 18$ m and $CE = DB$

So, $AE = 30.5 - 18 = 12.5$ m

In ΔAEC is a right-angled triangle at E.

$$\sin 30° = \frac{AE}{AC}$$

$\Rightarrow \frac{1}{2} = \frac{12.5}{AC}$

$\Rightarrow$ AC = 25

So, the length of the wire is 25 m.

52. Option (4) is correct.

Total number of exports of car-A from 2014 to 2016

$= 200 + 150 + 275 = 625$

Total number of exports of car-B from 2015 to 2017

$= 250 + 200 + 275 = 725$

Required percentage $= \frac{725-625}{725} \times 100 = 13.79\%$

$= 13.8\%$ (approx.)

53. Option (4) is correct.

$\text{cosec}^4 A(1 - \cos^4 A) - 2\cot^2 A - 1$

$= \text{cosec}^2 A.\text{cosec}^2 A(1 - \cos^2 A)(1+\cos^2 A) - 2\cot^2 A - 1$

$= \text{cosec}^2 A.\frac{1}{\sin^2 A}(\sin^2 A)(1+\cos^2 A) - \frac{2\cos^2 A}{\sin^2 A} - 1$

$= \text{cosec}^2 A(1+\cos^2 A) - \frac{2\cos^2 A}{\sin^2 A} - 1$

$= \frac{1+\cos^2 A}{\sin^2 A} - \frac{2\cos^2 A}{\sin^2 A} - 1$

$= \frac{1+\cos^2 A - 2\cos^2 A}{\sin^2 A} - 1$

$= \frac{1-\cos^2 A}{\sin^2 A} - 1 = \frac{\sin^2 A}{\sin^2 A} - 1 = 1 - 1 = 0$

54. Option (1) is correct.

Average of 11 consecutive positive integers is d.

Let us assume that the first integer of the series be N.

As per the question,

$N + (N + 1) + (N + 2) + ... + (N + 10) = 11d$

$\Rightarrow 11N + (1 + 2 + 3 + ...+ 10) = 11d$

$\Rightarrow 11N + 55 = 11d$

$\Rightarrow N + 5 = d$

$\Rightarrow N = d - 5$ ...(i)

Let the new average be A.

According to the question,

$N + (N + 1) + (N + 2) + ... + (N + 8) = 9A$

$\Rightarrow 9N + (1 + 2 + 3 + + 8) = 9A$

$9N + 36 = 9A$

$\Rightarrow N + 4 = A$

$d - 5 + 4 = A$ [From Eq. (i)]

$\Rightarrow A = d - 1$

So, average will decrease by 1.

55. Option (3) is correct.

Given that the total number of employees of the corporate office = 2,500

Number of employees of 28 + to 38 years

$= 25\% \times 2,500 = \frac{25}{100} \times 2,500 = 625$

Number of corporate office employees in the age group of 38 + years = (30 + 15 + 10)% × 2,500

$= 55\% \times 2500 = \frac{55}{100} \times 2,500 = 1,375$

Required percentage $= \frac{1,375-625}{625} \times 100\% = 120\%$

Number of corporate office employees in the age group of 38 + years and above is 120% more than the employees of age 28 + to 38 years.

56. Option (4) is correct.

Given that: $6 \tan A (\tan A + 1) = 5 - \tan A$

$6\tan^2 A + 7 \tan A - 5 = 0$

According to the concept,

Using quadratic formula for quadratic equation,

$$\tan A = \frac{-7 \pm \sqrt{7^2 - 4\times 6 \times (-5)}}{2\times 6}$$

$\Rightarrow \tan A = \frac{1}{2}$ and $\tan A = -\frac{5}{3}$

So, $\tan A = \frac{1}{2}$ (Since, $0 < A < \frac{\pi}{2}$)

We know that: $\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{1}{2}$

From Pythagoras Theorem

Hypotenuse $= \sqrt{2^2 + 1^2} = \sqrt{5}$

Now, $\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{2}{\sqrt{5}}$

and, $\sin A = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{1}{\sqrt{5}}$

$(\sin A + \cos A) = \frac{1}{\sqrt{5}} + \frac{2}{\sqrt{5}} = \frac{3}{\sqrt{5}}$

57. Option (2) is correct.

% change in the number of cars between 6 a.m. – 7 a.m.

$= \frac{105-70}{70} \times 100\% = 50\%$

% change in the number of cars between 7 a.m. – 8 a.m.

$= \frac{130-105}{105} \times 100\% = 23.8\%$

% change in the number of cars between 8 a.m. – 9 a.m.

$= \frac{(115-130)}{130} = -11.54\%$

% change in the number of cars between 10 a.m. – 11 a.m.

$= \frac{95-115}{115} \times 100\% = -17.39\%$

% change in the number of cars between 11 a.m. – 12 p.m.

$= \frac{45-95}{95} \times 100\% = -52.63\%$

(Negative sign indicates percentage decrease)

So, the minimum change % in the number of cars in comparison to the previous hour is 11.54%.

58. Option (2) is correct.

Given that points A and B are on the circle with centre O.

PA and PB are tangents to the circle from an external point P.

PA and PB are inclined to each other at 42°.

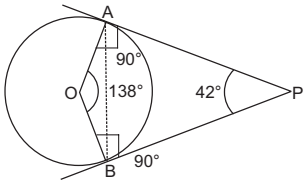
Let us make the figure based on above information.

Consider the quadrilateral AOBP,

$\angle A + 20° + \angle B + \angle P = 360°$

$90° + \angle O + 90° + 42° = 360°$

$\Rightarrow \angle O = 360° - 90° - 90° - 42° = 138°$



ΔOAB is an isosceles triangle since OA and OB are the radii of the circle.

So, $\angle OAB = \angle OBA = x°$ (let)

$\Rightarrow 2x° + 138° = 180°$

$\Rightarrow 2x° = 42°$

$\Rightarrow x° = 21°$

$\Rightarrow \angle OAB = 21°$

59. Option (4) is correct.

Given that college hostel mess has provision for 25 days for 350 boys.

At the end of 10 days, some boys were shifted to another hostel, it was found that now the provisions will last for 21 more days.

Available provisions = $25 \times 350 = 8750$ units

After 10 days the remaining provision

$= 8750 - 10 \times 350 = 5250$ units

Let us assume x be the number of boys shifted to another hostel.

According to the question,

$(350 - x) \times 21 = 5250$

$\Rightarrow 350 - x = \frac{5250}{21}$

$350 - x = 250$

$\Rightarrow x = 350 - 250 = 100$

So, 100 boys were shifted to another hostel.

60. Option (3) is correct.

Given that $\left(0.4x + \frac{1}{x}\right) = 5$

We know that: $(a)^3 + (b)^3 = (a + b)^3 - 3ab(a + b)$

Now, $\left(0.06x^3 + \frac{1}{x^3}\right)$

$\Rightarrow (0.4x)^3 + \left(\frac{1}{x}\right)^3 = \left(0.4x + \frac{1}{x}\right)^3 - 3 \times 0.4x \times \frac{1}{x}\left(0.4x + \frac{1}{x}\right)$

$= (5)^3 - 1.2 \times (5) = 125 - 6 = 119$

So, the required answer is 119.

61. Option (2) is correct.

Manjeet bought a 2nd hand motorbike for ₹ 22,000 and spent ₹ 3,000 on its maintenance and overhauling.

After this it was sold for 12% profit.

$\text{Profit\%} = \frac{\text{Selling price} - \text{cost price}}{\text{cost price}} \times 100\%$

Total C.P. occurred to Manjeet for the bike

$= ₹\ 22,000 + ₹\ 3,000 = ₹\ 25,000$

S.P. $= 25,000 + 25,000 \times 12\% = ₹\ 28,000$

Since he sold the bike for ₹ 500 less, the S.P. would have been $= 28,000 - 500 = ₹\ 27,500$

Now, his profit % $= \frac{27,500 - 25,000}{25,000} \times 100\% = 10\%$

His profit % would have been 10%.

62. Option (3) is correct.

When the difference between compound and simple interest is of two years is given then,

$\text{Difference} = \frac{P(R)^2}{(100)^2}$

where P = principal amount, R = rate of interest

Here, R = 15% and difference = ₹ 1,944

Now, $1944 = \frac{P \times 15^2}{100^2}$

$\Rightarrow 1944 \times 100 \times 100 = P \times 15 \times 15$

$\Rightarrow P = \frac{1,94,40,000}{15 \times 15} = ₹\ 86,400$

Now C.I. for 2 years for 10% rate of interest

$= 86,400 \times \left(1 + \frac{10}{100}\right)^2 - 86,400$

$= ₹\ 18,144$

63. Option (1) is correct.

Given,

Profit percentage = 20%

and gain amount = ₹ 30.80

Let the cost price = ₹ x

According the question,

$x \times \frac{20}{100} = 30.80$

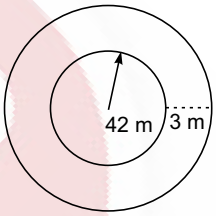
$x = \frac{3,080}{20} = 154$

So, selling price = 154 + 30.80

= ₹ 184.80

64. Option (3) is correct.

The inner circumference of a circular path is 264 m.



According to the problem,

$2\pi R = 264$

$\Rightarrow R = \frac{264}{2\pi}$

$\Rightarrow R = 42$

So, the outer radius of circular path = 42 + 3 = 45 m

Now, the area of the circular path $\pi (45^2 - 42^2)$

$\Rightarrow \pi \times 261 = 820.28 \cong 820\ m^2$

So, the area of the circular path is 820 m^2.

65. Option (2) is correct.

Lengths of sides of triangles proportional to the numbers 7, 24 and 30.

Let us assume that the sides of the triangles be $7p$, $24p$ and $30p$.

$(7p)^2 + (24p)^2 = 625p^2$

(By using Pythagoras theorem)

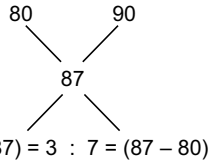
$(30p)^2 = 900p^2$

As we found that $(7p)^2 + (24p)^2 < (30p)^2$, we can conclude that the triangle is obtuse angled.

So the triangle with the lengths of its sides propor-tional to the numbers 7, 24 and 30 is obtuse angled.

66. Option (3) is correct.

Using the given data, we have



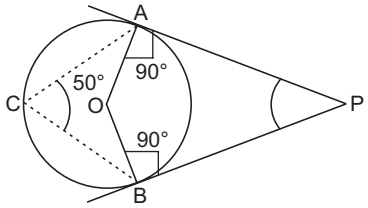
Ratio of quantity of 80% & 90% pure acid in the solution = 3 : 7

$\therefore$ 80% pure acid $= 20 \times \left(\frac{3}{10}\right) = 6$ litres

67. Option (3) is correct.

Given that a circle with centre O, PA and PB are tangents to the circle at A and B, respectively. C is a point on the major arc AB.

And $\angle ACB = 50°$



According to the concept,

$\angle AOB = 2 \times \angle ACB$

$\angle AOB = 2 \times 50° = 100°$

Consider the quadrilateral AOBP,

$\angle A + \angle O + B + \angle P = 360°$

$\Rightarrow 90° + 100° + 90° + \angle P = 360°$

(Since tangents are perpendicular to the radius at point of contact)

$\Rightarrow \angle P = 360° - 90° - 90° - 100°$

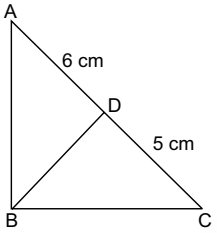
$\Rightarrow \angle P = 80°$

$\Rightarrow \angle APB = 80°$

68. Option (2) is correct.

Given that ΔABC is a right triangle and BD $\perp$ AC.

AD = 6 cm and DC = 5 cm



As per the given information. $\Delta ABC \sim \Delta BDC \sim \Delta ADB$

Since sides of similar triangles are in proportion

$BD^2 = AD \times DC$

$\Rightarrow BD^2 = 6 \times 5$

$\Rightarrow BD^2 = 30$

Also,

$AB^2 = AD \times AC$

$\Rightarrow AB^2 = 6 \times (AD + CD)$

$\Rightarrow AB^2 = 6 \times (6 + 5)$

$\Rightarrow AB^2 = 6 \times 11$

$\Rightarrow AB^2 = 66$

Now, $AB^2 + BD^2 = 30 + 66 = 96$ cm

69. Option (2) is correct.

A and B are 30% and 50%, respectively more than the number C

Let us assume that number C is $10x$

So, $A = 10x \times 130\% = 13x$

$B = 10x \times 150\% = 15x$

Now, $A : B = 13x : 15x = 13 : 15$

70. Option (2) is correct.

Number of TV sets manufactured by company C = 70,000

Number of TV sets sold by company C = 82% of 70,000 = 57,400

Number of TV sets manufactured by company D = 85,000

Number of TV sets sold by company D = 56% of 85,000 = 47,600

So the total TV sold by C and D = 57,400 + 47,600 = 1,05,000

Average no. of TV sold by C and D $= \frac{1,05,000}{2} = 52,500$

Number of TV sets manufactured by company E = 58,000

So the required $\% = \frac{52,500}{58,000} \times 100\% = 90.5\%$

71. Option (3) is correct.

Let us see the given equation $x^2 + \frac{1}{x^2} = 18$

$$x^2 + \frac{1}{x^2} + 2 = 20$$

[Using the formula $(a + b)^2 = a^2 + 2ab + b^2$]

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

Square rooting both the sides

$$\Rightarrow x + \frac{1}{x} = 2\sqrt{5} \quad \text{...(i)}$$

[Using the formula $a^3 + b^3 = (a + b)^3 - 3ab(a + b)$]

Now, cubing both the sides

$$\Rightarrow x^3 + \frac{1}{x^3} = \left(x + \frac{1}{x}\right)^3 - 3 \times x \times \frac{1}{x} \times \left(x + \frac{1}{x}\right)$$

$$= \left(2\sqrt{5}\right)^3 - 3\left(2\sqrt{5}\right)$$

$$= 40\sqrt{5} - 6\sqrt{5} = 34\sqrt{5}$$

So, $x^3 + \frac{1}{x^3} = 34\sqrt{5}$

72. Option (3) is correct.

Using the BODMAS rule,

[25 + 8 ÷ 2 – {16 + (14 of 7 ÷ 14) – (18 ÷ 12 of 1/2)}]

[25 + 8 ÷ 2 – (16+ (98÷ 14) – (18 ÷ 6)}]

$\Rightarrow$ [25+ 4 – {16 + 7 – 3}]

$\Rightarrow$ 25+ 4 – 20 = 9

73. Option (2) is correct.

Given number 3426*k* is divisible by 6 and not by 5.

Numbers which are divisible by both 2 and 3 are divisible by 6.

According to the concept,

Only 4 and 6 from the options can be the value of *k*

Now, 3 + 4 + 2 + 6 + 4 = 19 i.e., not divisible by 3

3 + 4 + 2 + 6 + 6 = 21 i.e., divisible by 3

So, $k = 6$

74. Option (2) is correct.

Given that average speed of Ram = 130 km/hr

Let us assume that the distance be x km

Time is taken by him $= \frac{x}{130}h$

75% of the distance = 75% of $x = \left(\frac{3}{4}\right)x$

Time is taken by him to complete the distance of x km $= \left(\frac{x}{130}\right) \times \left(\frac{2}{3}\right) = \frac{x}{195}$

Rest distance $= x - \left(\frac{3x}{4}\right) = \frac{x}{4}$

Time taken by him $= \left(\frac{x}{130}\right) - \left(\frac{x}{195}\right) = \frac{x}{390}$

Now, according to the question,

$$X = \frac{\frac{x}{4}}{\frac{x}{390}}$$

$$\Rightarrow X = \frac{390}{4}\text{km}$$

$$\Rightarrow X = 97.5 \text{ km}$$

So, $\frac{X}{2} = \frac{97.5}{2} = 48.75$

75. Option (1) is correct.

Given numbers are 2, 3, 10, 18 and 20.

Least or smallest number which is exactly divisible by 2, 3, 10, 18, and 20 is the LCM of these numbers.

LCM (2, 3, 10, 18, 20) = 180

$180 = 2^2 \times 3^2 \times 5$

So, to become a perfect square 180 needs to be multiplied by 5.

So, the least square number which is exactly divisible by 2,3,10,18 and 20 will be $180 \times 5 = 900$

English Comprehension

76. Option (2) is correct.

Explanation: The sentence erroneously uses the verb "gone." The sentence is in the present tense, so using the past participle form of the verb is incorrect. The correct usage will be "are going."

77. Option (3) is correct.

Explanation: The error lies in the usage of tense. The sentence is in past perfect tense. "Reading" of the book took place before the "hearing" of the lecture. So, "hearing" is incorrect, it should be "heard." When we speak about two actions happening in the past, the action that started first should be indicated by past perfect form of the verb and the second action by simple past form of the verb.. Hence, the correct substitute for "am hearing" is "heard."

78. Option (3) is correct.

Explanation: The meaning of "brittle" is frail, fragile. The antonym of brittle is durable.

79. Option (1) is correct.

Explanation: This question checks your understanding of phrases and idioms. "Smooth sailing" means without any problems or unexpected difficulties. Example: The main challenge for us is getting our EU license application approved. Once we have that, it should be smooth sailing.

80. Option (2) is correct.

Explanation: 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. The given sentence is in active voice. Hence, passive form of the given sentence should be "He should be asked to leave the room."

81. Option (3) is correct.

Explanation: Since the sentence is talking about a particular association, it should be preceded by the definite article "the." Thus, the (3) part of the given sentence is erroneous. It should be "the association."

82. Option (4) is correct.

Explanation: "Saucy" means: 1. rude and disrespectful; impudent. 2. lively and spirited; jaunty. 3. stylish; chic. The synonym of "saucy" is "cheeky."

83. Option (4) is correct.

Explanation: "Pliable" means "easily bent; flexible." Example: "Quality leather is pliable and will not crack." Smooth and bending are synonyms of pliable. The antonym of "pliable" is "unbending, rigid."

84. Option (1) is correct.

Explanation: The sentence has a prepositional error. The usage of "to" is incorrect; it should be "in." The correct expression is "badly in need of."

85. Option (4) is correct.

Explanation: One who is easily hurt emotionally is called "sensitive." Example: "I pay tribute to the minister for his sensitive handling of the bill." "Incensed" means very angry, enraged. Example: "Leonora glared back at him, incensed." "Sensible" means a person possessing or displaying prudence. Example: "He was a sensible and capable boy."

86. Option (3) is correct.

Explanation: "Even" can be used as an adjective or an adverb. It's mainly used for emphasis. "Even" takes middle position with the verb. If there is no auxiliary verb, it goes before the main verb. If there is an auxiliary verb, "even" goes after it. For example, I don't even know his name. China is even larger than India. "Even though" refers to a situation that is true. The meaning is close to "despite the fact." Example: "Even though we worked hard, we failed." The given sentence wants to state that Alex is strong as he easily picks up the heavy boxes. Hence, the correct usage is "even though."

87. Option (2) is correct.

Explanation: The correct idiomatic expression is "of all." "Of all others" is incorrect because the sentence is using a superlative adjective. If a comparative adjective is used with the force of a superlative adjective, then we use "of all others."

88. Option (3) is correct.

Explanation: "A gadget is a small tool, such as a machine, that has a particular function, but is often thought of as a novelty." Tools can be small or large, usually able to be held in your hands, and used to carry out a particular function. Apparatus means the technical equipment or machinery needed for a particular activity or purpose. In the context of the given sentence, "gadget" is the best expression.

89. Option (2) is correct.

Explanation: The paragraph is about "Good Governance Index." The subject is introduced in the sentence (C). Hence, (C) will introduce the paragraph. There is only one option starting with (C), option (2).

90. Option (1) is correct.

Explanation: A group of people is known as a "crowd." A herd is a large group of animals, especially hoofed mammals, that live together or are kept together as livestock. A flock is a group of birds of one kind feeding, resting, or travelling together. Brood means a family of birds or other young animals produced at one hatching or birth.

91. Option (1) is correct.

Explanation: Robust is sturdy and strong.

92. Option (3) is correct.

Explanation: 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. The given sentence is in the present continuous tense and is in the active voice. Hence, the passive form will be in the same tense.

93. Option (2) is correct.

Explanation: The incorrectly spelt word is "beginning." The correct spelling is "beginning."

94. Option (1) is correct.

Explanation: "On purpose" means "intentionally."

95. Option (4) is correct.

Explanation: Reporting the message of the speaker in the exact words as spoken by him is known as "direct speech." Reporting the message of the speaker in our own words is known as "indirect speech." When the reporting verb in direct speech is in the past tense, then the verb to be reported in the reporting element will be changed to the corresponding past tense in indirect speech.

96. Option (1) is correct.

Explanation: To express duration, we use the preposition "for."

97. Option (1) is correct.

Explanation: The hint is in the sentence that comes after the blank, which says, but his friend cheered him up. This means that the blank requires the polar opposite of cheering up. Hence, the best word to fill the blank is "depressed."

98. Option (3) is correct.

Explanation: Since the sentence preceding the blank talks about the person's friend cheering him up, the later sentence will be positive in tone and will tell what the friend did to cheer the person up. In this context, the best word to fill up the blank is "encouraged."

99. Option (1) is correct.

Explanation: The passage describes a person's experience of the situation when he decided to stay away from television. The passage states that initially the person felt depressed, but when his friend supported him, he was surprised to find life exciting without television. In the blank the best word to fill up is "surprised."

100. Option (2) is correct.

Explanation: The passage describes a person's experience of the situation when he decided to stay away from television. The passage states that initially the person felt depressed, but when his friend supported him, he was surprised to find life exciting without television. Thus, the blank can be filled with "exciting."