

General knowledge / Awareness

- Who among the following has become the first woman officer to join the Army Aviation Corps as a Combat Aviator?
 - Captain Abhilasha Barak
 - Captain Komal Singh
 - Captain Jaya Trivedi
 - Captain Sonam Agnihotri
- Where will Umagine Chennai 2023, Asia's largest summit on technology and innovation, be organized?
 - Ajmer
 - Chennai
 - Surat
 - Jaipur
- The 3d-printed rocket, called Terran 1, belongs to which of the following countries?
 - United States of America
 - China
 - Japan
 - India
- The staple commodities of export by the English East India Company from Bengal in the middle of the 18th century were:
 - Raw cotton, oil-seeds and opium
 - Sugar, salt, zinc and lead
 - Copper, silver, gold, spices and tea
 - Cotton, silk, saltpetre and opium
- Which of the following institute is situated in Gopeshwar, Uttarakhand:
 - National Institute of Technology Uttarakhand
 - Forest Research Institute, Dehradun
 - Herb Development and Research Institute of Uttarakhand
 - None of the above
- Who is the author of the book 'My Favorite Nature Stories'?
 - R. K. Narayan
 - Ruskin Bond
 - Vikram Seth
 - Arundhati Roy
- Who presented the Sangeet Natak Akademi Amrit Awards on September 16, 2023?
 - Droupadi Murmu
 - Jagdeep Dhankhar

- Amit Shah
- Rajnath Singh

- Which of the following is the currency of Thailand?
 - Rupee
 - Ringgit
 - Baht
 - Yuan
- Which Formula One racing driver has won the British F1 Grand Prix on 3 July 2022?
 - Lewis Hamilton
 - Sergio Perez
 - Carlos Sainz
 - Max Verstappen
- Which of the following is/are social security scheme(s)?
 - Atal Pension Yojana
 - Pradhan Mantri Jeevan Jyoti Bima Yojana
 - Pradhan Mantri Suraksha Bima Yojana
 Select the correct answer using the code given below:
 - 1 only
 - 2 and 3 only
 - 1, 2 and 3
 - 1 and 3 only

- Only conclusion II follows.
- Both conclusions I and II follow.
- Neither conclusion I nor II follows.

- Dharun has a brother Anand, Dharun is the son of Kumar. Krishnan is Kumar's father. How is Anand related to Krishnan?
 - Grandfather
 - Father
 - Grandson
 - Son

- Direction : In the given question below is given a statement followed by two conclusions numbered I and II. You have to assume everything in the statement to be true, then consider the two conclusions together and decide which of them logically follows the given statement and choose your answer according to that.

Statement : The government has spoiled many top-ranking financial institutions by appointing bureaucrats as Directors of these institutions.

Conclusions :

I. Government should appoint Directors of the financial institutes taking into consideration the expertise of the person in the area of finance.

II. The Director of the financial institution should have expertise commensurate with the financial work carried out by the institute.

- Only conclusion I follow
- Only conclusion II follow
- Either I or II follow
- Both I and II follow

- If $B = D$, $C = U$, $B > G$, $U > R$ and $C > S$, then which of the following expressions is NOT correct?

- $S < C$
- $S < U$
- $C < R$
- $G < D$

- Direction: Study the following information carefully and answer the questions given below.

A number arrangement machine, when given a particular input, rearranges it following a particular rule. The following is the illustration of the input and the steps of arrangement.

Input: 39 51 69 22 88 72 14 95

Step I: 05 39 51 69 22 88 72 04

Step II: 04 05 39 51 69 72 04 00

Step III: 12 04 05 51 69 04 00 05

Step IV: 06 12 04 05 04 00 05 03

And Step 4 is the last step of the rearrangement as the desired arrangement is obtained. As per rules followed in the above steps, find out in

General Intelligence/ Reasoning

- Direction: In the given series identify alphabets that are immediately followed by a symbol and immediately preceded by a number.

3 P # 9 I N M P 2 @ R \$ K 7 % 8 T 2 5 Y \$ # 6 J 4 3 M K 7 T E @

 - 2
 - 3
 - 5
 - 7
- If, '+' is coded as '!', '÷' is coded as '@', '×' is coded as '%', '-' is coded as '^' then find the value of the given equation.

13!102@6%2^41

 - 6
 - 9
 - 14
 - 12
- If the given statements (1) and (2) are true, which of the two conclusions I and II will follow from the statements?

Statements:
(1) Some ministers are teachers.
(2) All teachers are scholars.

Conclusions:
I. Some ministers are scholars.
II. All scholars are teachers.

 - Only conclusion I follows.

each of the questions the appropriate step for the given input.

Input: 59 23 78 91 35 84 63 97

Which step will be the last step for the input?

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

18. In a certain code language LACK is coded as 396, then how is BACK coded in the same language?

- (a) 72 (b) 56
(c) 66 (d) 86

19. Direction: The question below consists of a few statements. You have to decide whether the data provided in the statements are sufficient to answer the question. Read statements and give your answer.

What will be the day of the week 250 days after today?

Statement I: The day before yesterday was Sunday.

Statement II: The day after three days from today will be Friday.

- (a) Data in statement I alone is sufficient, while statement II is not sufficient to answer the question.
(b) Data in statement II alone is sufficient, while statement I is not sufficient to answer the question.
(c) Data in neither statement I nor II alone is sufficient to answer the question.
(d) Data in either statement I or II alone is sufficient to answer the question.

20. I am seventh in the queue from either end. How many people are there in the queue?

- (a) 13 (b) 11
(c) 10 (d) 14

21. Village P is to the east of village A. Village R is to the north of village P. Village S is to the west of Village R. Village S is towards which direction of village P?

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

22. Direction: In the question given below, a statement is given followed by assumptions. An assumption is something supposed or taken for granted. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement.

Statement: Communication is a two-way process that involves

giving and getting information.

Assumption:

I. The information is always oral.

II. Communication needs a language.

- (a) Only assumption I is implicit
(b) Only assumption II is implicit
(c) Both I and II are implicit
(d) Neither I nor II is implicit

23. 8 persons D, E, F, G, H, I, J and K are sitting around a square table, facing towards the centre (not necessarily in the same order). Four persons are sitting at the corners and four persons are sitting at the middle of the sides of the square table. D is sitting at one side and opposite to K. G is sitting at a corner and to the immediate right of D. D is the immediate neighbour of E and G. I is not the immediate neighbour of H. F is sitting at one side and opposite to H. Who is sitting just diagonally opposite to I?

- (a) K (b) H
(c) D (d) E

24. 6 persons A, B, C, D, E and F are sitting around a rectangular table, facing towards the centre (not necessarily in the same order). One person is sitting on each of the smaller sides. Two persons are sitting on each of the bigger sides. No person is sitting at the corners. C and F are sitting on the same side. B is sitting opposite to A. F is the immediate neighbour of B. A is sitting second to the left of D. Counting towards the left of D, how many persons are sitting between A and D?

- (a) Two (b) Three
(c) One (d) Zero

25. Find the missing term:

25, 125, 100, ?, 225

- (a) 2000 (b) 1000
(c) 5000 (d) 1500

General aptitude/ Numerical aptitude

26. Direction: In this table, we have shown that different home commodities of different -2 material, find the answer to the question given.

Commodities →	Ju g	buc ket	gl as s	so fa	ch air
Material ↓					

Wood	35 00	450 0	20 00	50 00	42 00
Plastic	36 00	400 0	24 00	55 00	32 00
Composite Metal	40 00	240 0	36 00	28 00	48 00
Iron	25 00	220 0	48 00	52 00	60 00

Calculate the sum of average of wood and plastic material for all five commodities.

- (a) 7900 (b) 7580
(c) 7100 (d) 8400

27. A solid metallic sphere of diameter 60 cm was melted and three solid spheres of diameter 20 cm, 30 cm and 40 cm were formed. If the weight of the remaining metal was 325 kg, find the weight of the solid sphere melted.

- (a) 300 kg (b) 600 kg
(c) 400 kg (d) 500 kg

28. A square is drawn by joining the midpoints of the sides of a given square. In the same way, this process continues indefinitely. If side of the first square is 4cm, then the sum of the area of all the squares are equal to:

- (a) 32cm^2 (b) 16cm^2
(c) 64cm^2 (d) 48cm^2

29. Three pipes C, D and E are together fill a cistern in 20 minutes. Pipe C alone can fill it in 45 minutes and pipe D alone can fill it in 60 minutes. How long will the pipe E alone take to fill the cistern?

- (a) 70 min (b) 75 min
(c) 80 min (d) 90 min

30. The compound interest on a sum of money for 2 years is rupees 500 and simple interest on the same sum for the same period and at the same rate is rupees 450, find the rate of interest.

- (a) $22\frac{2}{9}\%$ (b) $18\frac{1}{3}\%$
(c) $16\frac{2}{3}\%$ (d) $21\frac{2}{3}\%$

31. A person can ride a boat in the opposite direction of the stream at a speed of 10 km/h. And its speed in the direction of current is 16 km/h. Show the speed of the boat in calm water:

- (a) 17 km/h (b) 13 km/h
(c) 30 km/h (d) 29 km/h

32. A can build a wall in 12 days, B can do the same in 16 days, and C can do it in 24 days. Totally 6 walls are

to be built. *A* does the work for the first 16 days and *B* continues the work for the next 12 days. How many days should *C* work?

- (a) 94.0 (b) 47.0
(c) 48.0 (d) 24.0

33. Three taps *A*, *B*, and *C* can fill a tank in 180, 20, and 90 minutes respectively. If all the taps are opened together, then in how many minutes will the tank be filled?

- (a) 15 (b) 25
(c) 30 (d) 35

34. What is the third proportional to 16 and 24?

- (a) 28 (b) 34
(c) 32 (d) 36

35. 23 oranges were bought for ₹ 193.20 and sold at the rate of ₹ 108 per dozen. Find the profit percentage correct to one decimal place.

- (a) 5.9% (b) 8.4%
(c) 7.1% (d) 4.5%

36. If the number when subtracted from 37.5% of itself gives the result as 35, find the original number.

- (a) 90 (b) 49
(c) 56 (d) 72

37. The average of 24 numbers is 56. The average of the first 10 numbers is 71.7 and that of the next 11 numbers is 42. The next three numbers (i.e., 22nd, 23rd and 24th) are in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{5}{12}$. What is the average of the 22nd and 24th numbers?

- (a) 60.5 (b) 58
(c) 55 (d) 49.5

38. Find the value of $\sqrt{9 - 4\sqrt{5}}$.

- (a) $\sqrt{3} + 5$ (b) $\sqrt{5} - 2$
(c) $\sqrt{2} - 5$ (d) $\sqrt{5} + 3$

39. If $10^{3x} = 125$, then value of 10^{-2x} is:

- (a) $\frac{1}{5}$ (b) $\frac{1}{25}$
(c) $-\frac{1}{25}$ (d) 25

40. If the sum of digits of any integer lying between 100 and 1000 is subtracted from the number, the result will always be divisible by:

- (a) 9 (b) 6
(c) 2 (d) 5

items in this section has a sentence with three parts labelled as (a), (b) and (c). Read each sentence to find out whether there is any error in the given parts and indicate your response corresponding letter i.e., (a) or (b) or (c). If you find no error, your response should be indicated as (d).

- a) I look forward
b) to meet
c) you
d) No error

- (a) (a) (b) (b)
(c) (c) (d) (d)

42. Direction: Choose the word which is most opposite in meaning to the word.

A glance at a beautiful object gives us delight.

- (a) wisdom (b) happiness
(c) purity (d) peace

Ques (43-47): Direction : The following items have a sentence with a blank space and four words or groups of words given after the sentence. Select whichever word or group of words you consider most appropriate for the blank space and indicate your response.

43. I _____ her speak on Friday night about the advantages of organic gardening.

- (a) will have heard
(b) would hear
(c) would have heard
(d) will hear

44. The student _____ the professor for doubts in the assignment sheet.

- (a) Called on
(b) Called off
(c) Called around
(d) Called up

45. It is advisable to _____ sweets and junk food in order to stay healthy.

- (a) Cut down (b) Cut off
(c) Cut back on (d) Cut in

46. The Hotel chef acted in a very _____ fashion when I attempted to find out the ingredients of their signature dish.

- (a) Cagey (b) Accept
(c) Experience (d) Assume

47. Satish is seated _____ Sunita.

- (a) Besides (b) Beside
(c) Clearly (d) Closest

48. A person who creates maps is known as a:

- (a) Cartographer

- (b) Planner
(c) Designer
(d) Graph maker

49. Choose the most appropriate answer and fill in the blanks.

The noun form of 'happy' is _____.

- (a) happiness (b) happy
(c) joy (d) happyhood

50. Direction: Out of four alternatives given for idioms/phrases underlined in the following sentences, choose one which expresses meaning of the Idiom/Phrase.

Harish Salve is an important and powerful lawyer as he wins every court case he gets.

- (a) a jack of all trades
(b) a big shot
(c) a big gun
(d) Both (B) and (C)

51. Direction: Change the following sentence given below in the appropriate narration form.

She said, "I will have cooked the food by the time they arrive".

- (a) She said that she will have cooked the food by the time they would arrive.
(b) She said that she would cooked the food by the time they will arrive.
(c) She said that she would have cooked the food by the time they will arrive.
(d) She said that she would have cooked the food by the time they arrived.

52. Direction: Choose the most suitable answer for the following question.

My window looks _____ the garden.

- (a) up on (b) out into
(c) in (d) at

53. Direction: Choose the most appropriate preposition for the given sentence.

His house is just _____ the street from the church.

- (a) through (b) between
(c) across (d) to

54. Direction: Select the correct active form of the given sentence.

He has been granted a scholarship by the Principal.

- (a) The principal has been granted him a scholarship.
(b) The principal has granted him a scholarship.
(c) The principal has grant him a

English

41. Directions: Each of the following

scholarship.

- (d) The principal has granting him a scholarship.

55. Direction: Choose the most appropriate answer and fill in the blanks:

Rahim was shown as an intelligent, _____ and virtuous family man.

- (a) crowded (b) brutal
(c) courageous (d) stupid

56. Direction: Select the segment of the sentence that contains the grammatical error. If there is no error, mark 'No error' as your answer.

My room is largest enough (a)/ to accommodate as many (b)/ as ten people. (c)/ No error (d)

- (a) (a) (b) (b)
(c) (c) (d) (d)

57. Direction: Choose the appropriate preposition for the given sentence.

She hid her disappointment _____ a smile.

- (a) without (b) with
(c) in (d) through

58. Select the answer choice that identifies the noun in the sentence. Mastering basic mathematics is an important goal for younger students.

- (a) Mastering (b) Important
(c) Younger (d) Students

Ques (59-60): Direction: Find the correct word to complete these proverbs.

59. A leopard can't change its _____.

- (a) Tail (b) Stripes
(c) Spots (d) Nature

60. Every cloud has a silver _____.

- (a) Color (b) Hue
(c) Lining (d) Finish

Mathematics

61. The exponent of x occurring in the 7th term of expansion of $(\frac{3x}{2} - \frac{8}{7x})^9$ is:

- (a) -5 (b) 3
(c) 5 (d) -3

62. If the middle term in the expansion of $(x^2 + \frac{1}{x})^{2n}$ is $184756x^{10}$, then what is the value of n

- (a) 10 (b) 8
(c) 5 (d) 4

63. Find the coefficient of a^4 in the product $(1+2a)^4(2-a)^5$ using binomial theorem.

- (a) -378 (b) -398
(c) -408 (d) -438

64. For which value(s) of k will the roots of $3x^2 + 3 = 2kx$ be real and equal?

- (a) ± 2 (b) ± 4
(c) ± 3 (d) ± 5

65. Every quadratic equation $ax^2 + bx + c = 0$ where $a, b, c \in R, a \neq 0$ has:

- (a) Exactly one real root
(b) At least one real root
(c) At least two real roots
(d) At most two real roots

66. The roots of $100x^2 - 20x + 1 = 0$ is:

- (a) $\frac{1}{20}$ and $\frac{1}{20}$
(b) $\frac{1}{10}$ and $\frac{1}{20}$
(c) $\frac{1}{10}$ and $\frac{1}{10}$
(d) None of the above

67. If the area bounded by the curves $\{(x, y) | x^2 - y + 1 \geq 0\}$ and $\{(x, y) | x + y - 3 \geq 0\}$ is k square units, then the value of $3k$ is equal to:

- (a) 27 (b) 9
(c) $\frac{9}{2}$ (d) $\frac{27}{2}$

68. If $f(x)$ is a quadratic polynomial with vertex $V(1, \alpha)$, then the integral $I = \int_0^2 \frac{e^{f(x)}}{e^{f(x)} + e^{f(2-x)}} dx$ is equal to:

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

69. The probability that a number selected from 1, 2, 3, ..., 35 is a prime number is:

- (a) $\frac{12}{35}$ (b) $\frac{11}{35}$
(c) $\frac{10}{35}$ (d) $\frac{13}{35}$

70. Given three identical boxes A, B and C, each containing two coins. In box A both the coins are gold coins, in box B both the coins are silver and in box C there is one gold and one silver coin. A person chooses a box at random and takes out a coin. If the coin is gold what is the probability that the other coin is also gold?

- (a) $\frac{1}{3}$
(b) $\frac{2}{3}$

(c) $\frac{3}{4}$

(d) None of these

71. A six faced die is a biased one. It is thrice more likely to show an odd number than to show an even number. It is thrown twice. The probability that the sum of the numbers in the two throws is even is:

- (a) $\frac{4}{8}$ (b) $\frac{5}{8}$
(c) $\frac{6}{8}$ (d) $\frac{7}{8}$

72. A box contains three types of rings. Four square rings, three circular rings, and three hexagonal rings. 3 rings are drawn randomly. What is the probability that rings drawn contain 2 square rings?

- (a) 0.2 (b) 0.3
(c) 0.1 (d) 0.5

73. If $\frac{9x}{7} + \frac{3}{2} = 3(\frac{3}{14})x - \frac{6}{5}$, then what will be the value of $\frac{5x+14}{21}$?

- (a) 3 (b) 2
(c) 4 (d) $-\frac{1}{3}$

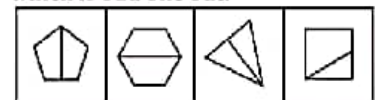
74. If $2x - 3y = 4$, and $x + 2y = 37$, find the value of $10x - 17y$.

- (a) 0 (b) 4
(c) 8 (d) 6

75. The distance of a point (3, 2) from a line $3x + 4y = 7$ is:

- (a) $\frac{2}{\sqrt{5}}$ units (b) 2 units
(c) 5 units (d) -5 units

76. In the given question, there are four figures given out of which three are similar in some manner and one is not like the others. Select the figure which is odd one out.



- (a) (a) (b) (d)
(c) (b) (d) (c)

77. If $AB = A$ and $BA = B$, where A and B are square matrices, then

- (a) $B^2 = B$ and $A^2 = A$
(b) $B^2 \neq B$ and $A^2 = A$
(c) $B^2 = B$ and $A^2 \neq A$
(d) $B^2 \neq B$ and $A^2 \neq A$

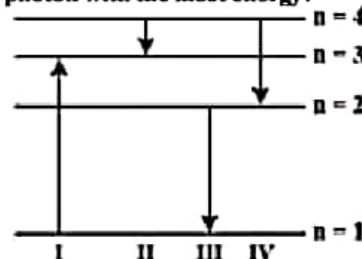
78. What is the inverse of the matrix

$$A = \begin{pmatrix} \cos \theta & \sin \theta & 0 \\ -\sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{pmatrix} :$$

coil.

- (c) It can be increased by increasing the strength of the magnetic field.
- (d) It can be increased by using a suspension fibre of a higher restoring couple per unit twist.

117. The diagram shows the energy levels for an electron in a certain atom. Which transition shown represents the emission of a photon with the most energy?



- (a) I (b) II
(c) III (d) IV

118. The kinetic energy of the electron in an orbit of radius r in the hydrogen atom is: (e = electronic charge)

- (a) $\frac{ke^2}{r^2}$ (b) $\frac{ke^2}{2r}$
(c) $\frac{ke^2}{r}$ (d) $\frac{ke^2}{2r^2}$

119. Which of the following quantities is scalar in nature?

- (a) Young's Modulus
(b) Volume
(c) Electric Current
(d) All of the above

120. Mass, length, speed, work, time and energy are the examples of _____.

- (a) Velocity
(b) Scalar
(c) Vector
(d) Displacement

// Hints and Solutions //

1(A). Captain Abhilasha Barak has become the first woman officer to join the Army Aviation Corps as a Combat Aviator after the successful completion of the Combat Army Aviation Course. The Army Aviation Corps was formed on 1 November 1986. Over the years, the Corps has strengthened its position with the introduction of new units and advanced equipment like Cheetah Dhruv, Rudra, LCH and Remotely Piloted Aircraft. Captain Abhilasha Barak hails from Haryana and was commissioned in the Army Air Defense Corps in September 2018.

2(B). Umagine Chennai 2023, Asia's largest summit on technology and innovation, will be organized in Chennai.

3(A). The 3d-printed rocket, called Terran 1, belongs to the United States of America. It is built by California aerospace startup Relativity Space.

4(D). Cotton and silk are the other staple commodities of export by the English East India Company from Bengal in the middle of the 18th century.

5(C). Herb Development and Research Institute of Uttarakhand is situated in Gopeshwar.

- Herbal Research and Development Institute (HRDI) is a government-run research institute founded in 1989 for conservation, development, and sustainable utilization of the valuable medicinal and aromatic plant resources of the regions of Uttarakhand.
- HRDI is located in Gopeshwar, is a township in the Garhwal hills and a municipal board within the Chamoli district of Uttarakhand.
- 18,000 plant species have been identified in the state, and about 1,800 of those are considered to be of medicinal value.
- Herbs, which are mentioned in Ayurvedic classical texts, continue to play a vital role in the region and are used by traditional local healers for ailments that can usually be cured with modern medicine.
- HRDI is a nodal agency of Uttarakhand State Medicinal Plant Board.
- Uttarakhand, which is spread over 53,000 square kilometers, including over 46,000 sq km in hilly terrain, has over 7,000 species of plants of which more than 1,100 are of medicinal value.
- The institute's primary objective is to coordinate medicinal and aromatic plant activities carried out by various government agencies, farmers, research institutes, non-governmental organizations (NGOs), and other stakeholders.

6(B).

- 'My Favorite Nature Stories' is a book written by Ruskin Bond.
- It is a collection of stories recounting the author's experiences with the natural world. It was published in 2016.

Author	Book
R. K. Narayan	Malgudi Days, The Guide
Vikram Seth	A Suitable Boy, The Golden Gate
Arundhati Roy	The God of Small Things, The Ministry of Utmost Happiness

7(B). Jagdeep Dhankhar presented the Sangeet Natak Akademi Amrit Awards on September 16, 2023.

8(C). Baht is the official currency of Thailand. It is divided into 100 satangs. The issuance of currency is the responsibility of the Bank of Thailand.

9(C). Ferrari's Carlos Sainz won his career's first Formula One race on 3 July 2022 with a victory at the British Grand Prix.

Red Bull's Sergio Perez and Mercedes' Lewis Hamilton finished second and third respectively. Championship leader Max Verstappen finished seventh. Sainz has moved up to fourth in the 2022 Driver standings.

10(C). The correct answer is 1, 2 and 3.

Atal Pension Yojana	- The scheme was launched on 9th May 2015, with the objective of creating a universal social security system for all Indians, especially the poor, the underprivileged, and the workers in the unorganized sector. - Any citizen of India can join the APY scheme. The age of the subscriber should be between 18-40 years. - It provides a minimum guaranteed pension ranging from Rs 1,000 to Rs 5,000 on attaining 60 years of age.
Pradhan Mantri Jeevan Jyoti Bima Yojana	- It is a life insurance scheme launched in 2015 for people between 18 and 50 years of age with bank accounts. - It provides a cover of Rs. 2 Lakh on natural death or death by accidents (term plan insurance). - The annual premium for the scheme is Rs. 330.
Pradhan Mantri Suraksha Bima Yojana	- It is a life Insurance Scheme to provide insurance cover at a minimal annual premium for death or disability by accidents. - The risk coverage of the scheme for accidental death or full disability is Rs. 2 lakhs and for partial disability is Rs. 1 lakh. - Anyone who falls in the age bracket of 18-70 years can avail the benefit of this scheme. - The annual premium is a meagre amount of Rs. 12.

11(A). Given: # 3 P # 9 I N M P 2 @ R \$ K 7 % 8 T 2 5 Y \$ # 6 J 4 3 M K 7 T E @

The two alphabets that are immediately followed by a symbol and immediately preceded by a number are P and Y.

3 P # 9 I N M P 2 @ R \$ K 7 % 8 T 2 5 Y \$ # 6 J 4 3 M K 7 T E @

12(A). The given equation is:

13!102@6%2^41

By replacing all the signs, according to the question,

$$\Rightarrow 13 + 102 \div 6 \times 2 - 41$$

$$\Rightarrow 13 + \left(\frac{102}{6}\right) \times 2 - 41$$

$$\Rightarrow 13 + 17 \times 2 - 41$$

$$\Rightarrow 13 + 34 - 41$$

$$\Rightarrow 47 - 41 = 6$$

13(A). From statement (1), we know that some ministers are teachers. And from statement (2), we know that all teachers are scholars. Based on this information, we can conclude that some ministers (who are also teachers) are scholars, which is conclusion I. However, conclusion II, which states that all scholars are teachers, cannot be deduced from the given statements because it is not necessarily true that just because someone is a scholar, they are also a teacher. There may be other scholars who are not teachers.

14(C). Since Kumar is Dharun's father, and Anand is Dharun's brother, so Kumar is Anand's Brother. Krishnan is Kumar's father, so grandfather of both Dharun and Anand.
So, Anand is the grandson of Krishnan.

15(D). According to the statement, the Government has spoiled financial institutions by appointing bureaucrats as Directors. This means that only those persons should be appointed as Directors who are experts in finance and are acquainted with the financial work of the institute. So, both I and II follow.

16(C). Given: $B = D$, $C = U$, $B > G$, $U > R$ and $C > S$

On combining the given expressions the statement is as follows: $D = B > G$, $S < C = U > R$

(A) $S < C \rightarrow$ True ($S < C = U > R$)

(B) $S < U \rightarrow$ True ($S < C = U > R$)

(C) $C < R \rightarrow$ False ($S < C = U > R$, relation between C and R is $C > R$)

(D) $G < D \rightarrow$ True ($D = B > G$)

Here, the expression $C < R$ is false and all other three are true.

Q.17 From a set of Eight numbers, the 'smallest number and the largest numbers are shifted to the left and right ends respectively.

The digits in smallest numbers are added and the result is written at the left end. For the largest number the difference of the digit is taken and written at the right end. From input to step 1, the addition of the digits of the smallest number is shifted to the left end and the difference of the digits of the largest numbers is shifted to the right end.

From step 1 to step 2, the addition of digits of the second smallest number is shifted to the left end. The difference of the digits of the second largest number is shifted to the right end.

The above said process is followed until we

the desired output.

Input: 59 23 78 91 35 84 63 97

Step 1: 05 59 78 91 35 84 63 02

Step 2: 08 05 59 78 84 63 02 08

Step 3: 14 08 05 78 63 02 08 04

Step 4: 09 14 08 05 02 08 04 01

17(A). So, step 4 step will be the last step for the input.

18(C). The pattern is as follows:

$$L A C K = 12 \times 1 \times 3 \times 11 = 396$$

Similarly,

$$B A C K = 2 \times 1 \times 3 \times 11 = 66$$

19(D). Statement I: Sufficient

The day before yesterday was Sunday so, today is Tuesday and 250 days after Tuesday can be determined.

Statement II: Sufficient

Three days from today is Friday so, today is Tuesday and 250 days after Tuesday can be determined.

Therefore, Data in either statement I or II alone is sufficient to answer the question.

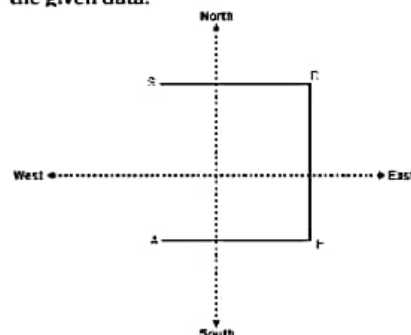
20(A). Given:

As the person is 7th from the either end, implies, there are 6 persons ahead of him and 6 persons behind him as shown below.

The number of people in the queue = $6 + 6 + 1 = 13$ person.

So, there are 13 persons in the queue.

21(C). The direction distance diagram for the given data:



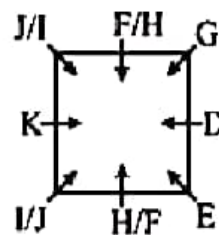
So, 'village S is to the North-West of village P'.

22(D). The statement suggests that communication is a two-way process and includes giving and getting information. From what is supplied it cannot be assumed that communication is always oral (involving speech).

So, assumption I is not implicit.

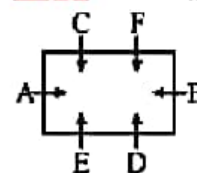
Also, from what is given it cannot be assumed that communication is dependent on language. Non-verbal communication involving gestures also takes place. Therefore, assumption II is not implicit.

23(D). The arrangement will be:



From the given figure, either E or G is sitting opposite to I. However, G is not given in the option. So, the correct answer is E.

24(C). The arrangement will be:



25(B). The logic is as follows:

$$5^2 = 25$$

$$5^3 = 125$$

$$10^2 = 100$$

$$10^3 = 1000$$

$$15^2 = 225$$

26(B). Average of wood material = $3500 + 4500 + 2000 + 5000 + 4200 = \frac{19200}{5} = 3840$

Average of plastic material = $3600 + 4000 + 2400 + 5500 + 3200 = \frac{18700}{5} = 3740$

$\therefore$ Required sum = $3840 + 3740 = 7580$

27(B). We know that,

$$\text{Volume of sphere} = \left(\frac{4}{3}\right)\pi \times (\text{radius})^3$$

$$= \left(\frac{\pi}{6}\right) \times (\text{diameter})^3$$

Volume of sphere melted

$$= \left(\frac{\pi}{6}\right) \times (60)^3 = 36000\pi \text{ cm}^3$$

Volume of sphere with diameter 40 cm

$$= \left(\frac{\pi}{6}\right) \times (40)^3 = \left(\frac{32000\pi}{3}\right) \text{ cm}^3$$

Volume of sphere with diameter 20 cm

$$= \left(\frac{\pi}{6}\right) \times (20)^3 = \left(\frac{4000\pi}{3}\right) \text{ cm}^3$$

Volume of sphere with diameter 30 cm

$$= \left(\frac{\pi}{6}\right) \times (30)^3 = \left(\frac{4500\pi}{3}\right) \text{ cm}^3$$

Volume of metal remaining

$$= 36000\pi - \left(\frac{32000\pi}{3} + \frac{4000\pi}{3} + 4500\pi\right)$$

$$= 19500\pi$$

$$\text{cm}^3$$

Now,

Weight of remaining metal = 325 kg

This means that weight of $19500\pi \text{ cm}^3$ metal is 325 kg

$\therefore$ Weight of sphere melted = Weight of

$$36000\pi \text{ cm}^3 \text{ metal} = \left(\frac{36000\pi}{19500\pi}\right) \times 325 =$$

$$600 \text{ kg}$$

28(A). As we know,

$$\text{Area of square} = (\text{Side})^2$$

The sum of infinite, i.e. the sum of a GP with infinite terms is $S_\infty = \frac{a}{(1-r)}$ such that

$$0 < r < 1.$$

Side of the first square = 4cm

Side of the second square = $2\sqrt{2}\text{cm}$

Side of the third square = 2cm

and so on i.e., $4, 2\sqrt{2}, 2, \sqrt{2}, 1, \dots$

Thus, the area of the square will be $16, 8, 4, 2, 1, \dots$

From here we find that area of the square is in the geometrical progression

Where the common ratio, $r = \frac{8}{16}$

$$= \frac{1}{2}$$

$$\text{Sum of area of all squares} = \frac{16}{(1 - \frac{1}{2})}$$

$$= 16 \times 2$$

$$= 32\text{cm}^2$$

$\therefore$ The sum of areas of all the squares is 32cm^2 .

29(D). Given:

C, D and E together fill a tank in 20 minutes.

Pipe C alone can fill it in 45 minutes

Pipe D alone can fill it in 60 minutes

Tank filled in 1 minute by C, D and E = $\frac{1}{20}$

Tank filled by C in 1 minute = $\frac{1}{45}$;

Tank filled by D in 1 minute = $\frac{1}{60}$

Time taken by pipe E alone to fill a tank

$$= \left[\left(\frac{1}{20} \right) - \left(\frac{1}{45} + \frac{1}{60} \right) \right]$$

$$= \left[\left(\frac{1}{20} \right) - \left(\frac{7}{180} \right) \right]$$

$$= \left[\frac{(9-7)}{180} \right]$$

$$= \frac{2}{180}$$

$$= 90 \text{ minutes}$$

30(A). Given:

Simple interest for 2 years Rs. = 450

Simple interest for 1 year Rs. = $\frac{450}{2}$ Rs.

$$= 225$$

Compound interest for first year Rs. = 225

Compound interest for 2 year Rs. = 500

Compound interest for second year = $500 - 225$ Rs. = 275

Difference of interest Rs. = $275 - \text{Rs. } 225$

$$\text{Rs.} = 50$$

Rs. 50 is the interest on rupees 225 for one year.

$$\text{Rate of interest} = \frac{50 \times 100}{225}$$

$$= \frac{200}{9} \%$$

$$= 22\frac{2}{9} \%$$

31(B). The boat moves 10 km/h in the opposite direction of the stream to the person. And its speed in the direction of the stream is 16 km/h

According to the given formula,

Speed of boat in calm water

$$= \frac{(\text{Speed in the current of the stream} + \text{Speed in the opposite direction of the stream})}{2}$$

$$\text{Speed of boat in calm water} = \frac{10+16}{2} = 13\text{ km/h}$$

32(A). We know, Time $\times$ rate = work

Let's consider the work of building one wall to be 48 units. (LCM of 12, 16, and 24)

A total of 6 walls are to be built. i.e.

$$6 \times 48 = 288 \text{ units}$$

	A	B	C
Time	12	16	24
Rate	4	3	2
Work	48	48	48

Thus, rates of A, B, and C are 4, 3, and 2 respectively per day.

Work done by A (1st 16 days)

$$= 4 \times 16 = 64$$

Work done by B (next 12 days)

$$= 3 \times 12 = 36$$

Total work done by A and B

$$= 64 + 36 = 100 \text{ units}$$

Work remaining = $288 - 100 = 188$ units

So, Work done by C = 188 = $2 \times$ no. of days C has to work

$$\therefore \text{No. of days C has to work} = \frac{188}{2} = 94$$

days

33(A). Tap A can fill the tank = 180 minutes

Tap A's one-minute work = $\frac{1}{180}$

Tap B can fill the tank = 20 minutes

Tap B's one-minute work = $\frac{1}{20}$

Tap C can fill the tank = 90 minutes

Tap C's one-minute work = $\frac{1}{90}$

When all the taps are opened together,

$$A + B + C = \left(\frac{1}{180} + \frac{1}{20} + \frac{1}{90} \right) =$$

$$\frac{(1+9+2)}{180} = \frac{12}{180} = \frac{1}{15}$$

So, (A + B + C) working together can fill the whole tank in 15 minutes.

34(D). We know that,

The third proportional proportion is the second term of the mean terms.

For example, if we have $a : b = c : d$, then the term 'c' is the third proportional to 'a' and 'b'.

Represented as:

$$a : b :: b : c$$

Let the third proportion to 16 and 24 be x.

$$\frac{16}{24} = \frac{24}{x}$$

$$\Rightarrow x = \frac{(24 \times 24)}{16}$$

$$\Rightarrow x = 36$$

35(C). Given:

23 oranges were bought for ₹ 193.20 and sold at the rate of ₹ 108 per dozen.

Cost of 23 oranges = 193.20

Cost of 1 orange = $\frac{193.20}{23}$

$$= 8.4$$

Cost of 12 orange or 1 dozen = 8.4×12

$$= 100.8$$

$$\text{Profit} = 108 - 100.8$$

$$= 7.2$$

$$\text{Profit \%} = \left(\frac{7.2}{100.8} \right) \times 100$$

$$= 7.14\% \approx 7.1\%$$

$\therefore$ The profit percentage correct to one decimal place is 7.1%.

36(C). Given:

Let the original number be 100x.

The number when subtracted from 37.5% So, New number = $100x \times \left(\frac{100 - 37.5}{100} \right) =$

$$62.5x$$

Resulting number = $35 = 62.5x$

$$\Rightarrow x = 0.56$$

$$\Rightarrow 100x = 0.56 \times 100 = 56$$

$\therefore$ Original value of number is 56.

37(A). Deviation on first 10 numbers = $(56 - 71.7) \times 10 = -157$

Deviation on next 11 numbers = $(56 - 42) \times 11 = 154$

Sum of 22nd, 23rd and 24th = $56 \times 3 - 157 + 154 = 168 - 3 = 165$

Ratio of 22nd, 23rd and

$$24^{\text{th}} = \frac{1}{2} : \frac{1}{3} : \frac{5}{12} = \frac{12}{2} : \frac{12}{3} : \frac{(12 \times 5)}{12}$$

$$= 6 : 4 : 5$$

Average of 22nd and 24th number = $\frac{(6+5)}{2} = 5.5$

$$6 + 4 + 5 = 15 \text{ unit}$$

$$\Rightarrow 15 \text{ unit} = 165 \Rightarrow 1 \text{ unit} = 11 \Rightarrow 5.5 \text{ unit} = 60.5$$

38(B). Given,

$$\sqrt{9 - 4\sqrt{5}}$$

As we know,

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

$$\sqrt{9 - 4\sqrt{5}}$$

$$= \sqrt{5 + 4 - 4\sqrt{5}}$$

$$= \sqrt{\sqrt{5}^2 + 2^2 - 2 \times 2 \times \sqrt{5}}$$

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

$$= \sqrt{5} - 2$$

39(B).

$$10^{3x} = 125 \Rightarrow 10^{3x} = 5^3 \Rightarrow 10^x = 5^{\frac{1}{3}} \Rightarrow 10^x = 5$$

$$\text{Now, } 10^{-2x} = (10^x)^{-2} = 5^{-2} = \frac{1}{25}$$

40(A). Given: The sum of digits of any integer lying between 100 and 1000 is subtracted from the number.

Calculation:

First we randomly assume a 3 digit number, 469 and subtracting its sum of digits from itself, obtain 450 which is divisible by 2, 5, 6, and 9 all. Next we again assume a random 3 digit number, 878 getting derived result 855, which is divisible by 5 and 9. So with this test we have been able to eliminate the other two choice values 2 and 6.

Next we assume randomly 423, getting derived result, 414, divisible by 9, 2 and 6, but not 5.

So by applying exclusion principle on the three results we conclude, the result will always be divisible by only 9.

41(B). The infinitive 'meet' used in the sentence is incorrect, the gerund "meeting" should be used in the sentence, the object of the preposition "to".

The adverbial prepositional phrase "to meeting" modifies the intransitive phrasal

verb "look forward." "I", is the subject.
Correct sentence: I look forward to meeting you.

42(B). Delight means please (someone) greatly.

Happiness means the state of being happy.
Wisdom means having the quality of having experience, knowledge, and good judgment;
Purity means freedom from adulteration or contamination.

Peace means freedom from disturbance; tranquillity.

The option that is nearest in meaning to the underlined word 'delight' is 'happiness'.

43(D). This sentence is in the future indefinite tense as it mentions the action which is to take place in future.

"Would" is the past of "will". It is generally used to denote past routine action or when we talk about future action in the past.

E.g., Rani told me she would give you notes.
We use future perfect tense for time expression. As, in the sentence, there is no time expression, we will not use "will have heard".

The correct sentence: "I will hear her speak on Friday night about the advantages of organic farming."

44(A). The correct word that should come in place of the blank is 'called on'. 'Called on' means to ask for an answer or opinion. So, the complete sentence is, "The student called on the professor for doubts in the assignment sheet".

45(C). The correct word that should come in place of the blank is 'cut back on'. 'Cut back on' means to consume less. So, the complete sentence is, "It is advisable to cut back on sweets and junk food in order to stay healthy".

46(A). 'Cagey' is the correct word that should come in the place of the blank. It is used to denote something that is characterized by great caution and wariness. So, the complete sentence is, "The Hotel chef acted in a very cagey fashion when I attempted to find out the ingredients of their signature dish".

47(B). The usage of the words given in the options are:

Besides: (preposition) in addition to; apart from.

Beside: (preposition) at the side of; next to.

Clearly: (adverb) in a clear manner; in a manner which is easy to understand; with clarity.

Closest: it is a superlative degree of adjective 'close'. Only the shortest distance away or apart in space or time.

"Satish is seated _____ Sunita."

Here in the given sentence, if we try to put all the options one by one, we find that "clearly" cannot be used in the blank as it is an adverb which does not show any relation

between Satish and Sunita. "Closest" takes preposition "to" with it. So, "closest" will also not be correct. If we put "besides", it will not make any sense. The only word that fits perfectly is "beside" which makes a meaningful sentence.

48(A). The person who makes a map or map is called 'Cartographer'.

49(A). The noun form of 'happy' is happiness.

Nouns often end with the suffixes: -ment, -ion, -ness, -ity, -ance or -ence. The suffixes -tion and -sion are also found at the end of many nouns. For example, the verb "kind" can become "kind **ness**".

You can also add a determiner before the identified verb. A determiner is a word like "the" or "a", which usually signifies the following word will be a noun.

For example, to change "settle" to a noun, you would need the determiner "the" or the determiner "a," therefore you will get the noun form "the / a **settlement**".

Thus the noun form of 'happy' is 'happi **ness**'.

50(D). A jack of all trades (Idiom): A person who has dabbled in many skills.

A bit shot (Idiom): An important or influential person.

A big gun (Idiom): An important or influential person.

51(D). In the given sentence, the reporting verb is in Past tense. In Future Perfect tense, 'will have' changes into 'would have' in Indirect form. First-person pronoun changes according to the subject of reporting speech. So, pronoun 'I' will be replaced by 'she'.

Thus the appropriate narration form is, She said that she would have cooked the food by the time they arrived.

52(B). My window looks out into the garden.

Here, out into is the right usage.

53(C). Complete sentence: His house is just across the street from the church.

'across' means from one side to the other of something with clear limits, such as an area of land, a road, or a river. For example: She walked across the field/road. Therefore, in the given sentence the most appropriate preposition is 'across' because it indicates that the house is on the other side of the street with respect to the Church.

54(B). The given sentence is in passive voice and it is in Present Perfect Tense.

Rule:

Subject + (has /have) + V3 + Object+ Other agents.

Passive voice: He has been granted a scholarship by the Principal.

Active voice: The principal has granted him a scholarship.

55(C). Courageous: not deterred by danger or pain, brave.

Crowded: (of a space) full of people, leaving little or no room for movement; packed.

Brutal: savagely violent.

Stupid: having or showing a great lack of intelligence or common sense.

56(A). We use the positive degree of adjective/adverb before 'enough'.

For example:

Jaggi runs fast enough to win the race.

WRONG

Jaggi runs fast enough to win the race.

RIGHT

Hence according to the given rule, we will use 'large' instead of 'largest' the 1st part.

57(B). The preposition 'with' can be used 'in the sense of using or with the help of'.

Examples,

He cleared the exam with hard work.

The given sentence means that she hid her disappointment with the help of a smile.

According to the explanation and example that are given above, 'with' is the correct word for the blank.

Correct Sentence- She hid her disappointment with a smile.

58(D). Students is a plural noun. Mastering (A) is a gerund, i.e. a verb form functioning as a noun. But since (D) is already a noun, it is the better choice. Important (B) is an adjective modifying the noun goal. Younger (C) is an adjective modifying the noun students.

59(C). A leopard can't change its spots.

60(C). Every cloud has a silver lining.

61(D). We have the general term of $(x + a)^n$ is

$$T_{r+1} = {}^nC_r (x)^{n-r} (a)^r$$

$$\text{Now, consider } \left(\frac{3x}{2} - \frac{8}{7x}\right)^9$$

$$\text{Here } n = 9 \text{ and } r + 1 = 7$$

$$\Rightarrow r = 6$$

$$\text{Also, } x = \frac{3x}{2} \text{ and } a = -\frac{8}{7x}$$

$$\therefore T_7 = T_{6+1} = {}^9C_6 \left(\frac{3x}{2}\right)^3 \left(-\frac{8}{7x}\right)^6$$

$$= {}^9C_6 \left(\frac{3}{2}\right)^3 \left(-\frac{8}{7}\right)^6 x^{-3}$$

$$\text{Hence, the exponent of } x = -3$$

62(A). Concept:

The general term in the binomial expansion of $(a + b)^n$ is given by:

$$T_{(r+1)} = {}^nC_r \times a^{n-r} \times b^r$$

In the expansion of $(a + b)^n$:

I. The middle term is $\left(\frac{n}{2} + 1\right)$ th term if n is even.

II. If n is odd the two middle terms are: $\left(\frac{n+1}{2}\right)$ th and $\left(\frac{n+1}{2} + 1\right)$ th terms.

Calculation

Given:

The middle term in the expansion of $\left(x^2 + \frac{1}{x}\right)^{2n}$ is $184756x^{10}$.

As 2n is even