

STAFF SELECTION COMMISSION
COMBINED GRADUATE LEVEL (TIER-I)

SOLVED PAPER

(8th December 2022: Shift-3)

Time Allotted: 1 hour

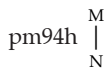
Max marks: 200

General Intelligence and Reasoning

1. Select the correct combination of mathematical signs to sequentially replace the * signs and balance the given equation.

$$59 * 12 * 6 * 24 * 2 * 105$$

1. -, +, -, +, = 2. ×, -, +, ×, =
3. +, ×, +, -, = 4. -, ÷, +, ×, =
2. F + M means 'F is the husband of M'.
F ÷ M means 'F is the daughter of M'.
F - M means 'F is the father of M'.
F × M means 'F is the mother of M'.
If $U + V \times K - B$, then how is U related to B?
1. Paternal grandmother 2. Paternal grandfather
3. Maternal grandmother 4. Father
3. Select the correct mirror image of the given combination when the mirror is placed at line MN as shown below.



1. $\mu \uparrow 6 m d$ 2. $\uparrow \uparrow \theta m q$ 3. $h 4 \theta m q$ 4. $h \uparrow \theta \omega q$
4. Which figure should replace the question mark (?) if the series were to be continued?

T	N	Δ	N	
A O Z	Δ T A	O A T	E Δ O	?
N	O	N	A	

1. 2. 3. 4.

5. Select the figure that will come next in the following figure series.



1. 2. 3. 4.

6. Which of the following terms will replace the question mark(?) in the given series?

LKC KMD ? IQF HSG

1. JOP 2. IOJ 3. IOE 4. JOE
7. In a certain code language, 'ABASE' is coded as 'ZEVVD' and 'BANDS' is coded as 'EZQGV'. How will CABIN be coded in that language?
1. FZYLK 2. FAEIQ 3. FZEHQ 4. FDELQ
8. Which number will replace the question mark (?) in the following series?
37, 39, ? 242, 970, 4852
1. 80 2. 122 3. 108 4. 160
9. Select the set in which the numbers are related in the same way as the numbers of the following sets.

(NOTE: Operation should be performed on the whole numbers, without breaking down the number into its constituent digits).

(2, 4, 18)

(1, 9, 50)

1. (3, 5, 32) 2. (2, 5, 49) 3. (6, 4, 10) 4. (5, 4, 18)

10. Which letter-cluster will replace the question mark (?) to complete the given series?

EGJM, GFLN, IENO, ? MCRQ

1. KDPP 2. KPDD 3. KPDK 4. KPDP

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

Statements:

Some floors are plates.

No plate is a sofa

All gardens are plates.

Conclusions:

I. Some floors being gardens is a possibility.

II. No garden is a sofa.

III. All plates are gardens.

IV. No floor is a sofa

1. Only conclusion I follows.

2. Only conclusions I, II and IV follows.

3. Only conclusions II and III follows.

4. Only conclusions I and II follows.

12. If $A \div B$ means that A is the brother of B, $A \times B$ means that A is the sister of B, $A - B$ means that A is the father of B, then which of the following expression shows that P is the father of R?

1. $P - Q \times R$ 2. $P \times Q - R$ 3. $P \div Q \times P$ 4. $P \times Q \div R$

13. In the following question below are given some statements followed by some conclusions based on those statements. Taking the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusion logically follows the given statements.

Statements:

I. No P is Q.

II. All B are Q.

Conclusions:

I. No P is B.

II. Some Q are not P.

III. Some B are not Q.

1. Both conclusions I and II follows.

2. Both conclusions I and III follows.

3. Only conclusions I follows.

4. Neither conclusions follow.

14. Select the set in which the number are related in the same way as the numbers of the following sets.

(NOTE: Operations should be performed on the whole numbers, without breaking down the number into its constituent digits. For example: 13 - Operations on 13 such as adding/subtracting/multiplying, etc. to 13 can

be performed. Breaking down 13 into 1 and 3 and then performing mathematical operation on 1 and 3 is not allowed).

(5, 35, 7)
(8, 32, 4)

1. (11, 56, 5) 2. (3, 27, 9) 3. (4, 30, 7) 4. (9, 38, 4)
15. Which of the following equations will be correct by interchanging the given two signs?
× and -
1. $7 \times 9 - 8 \div 2 + 6 = 25$ 2. $8 \times 6 - 9 \div 3 + 10 = 0$
3. $16 - 4 \div 2 + 8 \times 1 = 36$ 4. $5 + 7 \times 3 - 4 \div 2 = 8$
16. Select the set in which the numbers are related in the same way as the numbers of the following sets.
(99, 199, 1199)
(15, 115, 1115)

(NOTE: Operations should be performed on the whole numbers, without breaking down the number into its constituent digits. For example: 13 – Operations on 13 such as adding/subtracting/multiplying, etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is NOT allowed).

1. (11, 111, 1000) 2. (33, 133, 1133)
3. (22, 222, 2222) 4. (77, 717, 7117)
17. By interchanging the given two signs which of the following equation will be correct?
÷ and +
1. $18 \div 24 - 6 \times 6 + 3 = 32$ 2. $12 - 8 + 12 \times 9 \div 3 = 10$
3. $12 \div 8 \times 3 + 6 - 10 = 8$ 4. $7 + 21 \times 42 \div 14 - 9 = 19$


18. Three different positions of the same dice are shown. Find the number on the face opposite to the face showing '1'.
- 

Figure 1




Figure 2




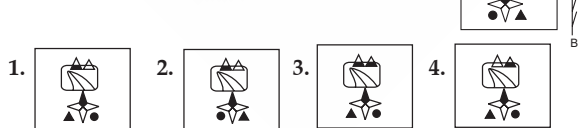
Figure 3
1. 6 2. 3 3. 2 4. 4

19. In a certain code language, 'come home soon' is coded as '444', 'are you coming' is coded as '336', and 'raining badly outside' is coded as '757'. How will 'kids are happy' be coded in that language?
1. 543 2. 435 3. 345 4. 534
20. Select the option that is related to the third word in the same way as the second word is related to the first word. (The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word.)
Cells : Tissue :: Organs : ?

1. Kidney 2. Lungs 3. Body 4. Heart
21. Select the word-pair that best represents a similar relationship to the one expressed in the pair of words given below. (The words must be considered as meaningful English words and must not be related to each other based on the number of letter/number of consonants/vowels in the word.)
Librarian : Library

1. Sailor : Aeroplane 2. Priest : Temple
3. Watchmen : Train 4. Doctor : Treatment
22. Four letter-clusters have been given out in which three are alike in some manner and one is different. Select the one that is different.
1. MJG 2. GEB 3. WTQ 4. OLI

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



24. Select the option that represents the correct order of the given words as they would appear in an English dictionary.

1- Empress 2- Employee 3- Empty
4- Emporium 5- Employer

1. 5, 2, 1, 4, 3 2. 2, 5, 1, 4, 3 3. 2, 5, 4, 1, 3 4. 5, 2, 4, 1, 3
25. In the following question, four number pairs are given. In each pair, the number on the left side of (-) is related to the number on the right side of (-) with some Logic/Rule/Relation. Three pairs are similar on basis of the same Logic/Rule/Relation. Select the odd one out from the given alternatives. (NOTE: Operations should be performed on the whole numbers without breaking down the numbers into its constituent digits. For example, 13 – Operations on 13 such as adding/subtracting/multiplying, etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed).
1. 12 – 142 2. 8 – 62 3. 4 – 14 4. 14 – 192

General Awareness

26. Which of the following towns was grown as a temple town during the Chola dynasty?
1. Bhillasvamin 2. Ajmer
3. Ahmedabad 4. Ahmednagar
27. The major resources of Gondwana coal, which are metallurgical coal are located in _____.
1. Damodar Valley 2. Chambal Valley
3. Krishna Valley 4. Narmada Valley
28. The ICC Women's Cricket World Cup 2022 was held in _____.
1. England 2. India
3. Australia 4. New Zealand
29. Identify the organisms that do NOT belong to the third trophic level.
1. Fish 2. Wolve 3. Bird 4. Cow
30. In 'Andes Mountains' of South America, the animal which is used for transportation is _____.
1. Bullock 2. Camel 3. Donkey 4. Llama
31. The early Turkish rulers ruled between _____ years over Delhi.
1. 1165 and 1198 2. 1226 and 1290
3. 1206 and 1290 4. 1192 and 1225
32. Surekha Punekar is a _____ dancer from the Indian state of Maharashtra.
1. Tamasha 2. Lavani 3. Povada 4. Koli
33. The 15 men's FIH hockey cup will be held in the year _____.
1. 2022 2. 2025 3. 2024 4. 2023
34. The core of earth is made up of _____.
1. cobalt and nickel 2. iron and cobalt
3. nickel and magnesium 4. nickel and iron
35. Who among the following is NOT an exponent of Mohiniyattam classical dance form?
1. Smitha Rajan 2. Jayaprabha Menon
3. Prateeksha Kashi 4. Radha Dutta
36. Fundamental Rights are mentioned in which part of the Constitution of India?
1. Part IV 2. Part III 3. Part VI 4. Part IX
37. The famous hill station Udagamandalam is also known as _____.
1. Kodaikanal 2. Shivpuri 3. Ooty 4. Mussoorie
38. The Council of Ministers shall not exceed _____ % of the total number of members of the Assembly of States.
1. 15 2. 20 3. 12 4. 10

39. The United Nations Environment Programme has signed a Memorandum of Understanding with the _____ government to support its 'Majhi Vasundhara' campaign.
1. Maharashtra 2. Rajasthan 3. Karnataka 4. Gujarat
40. Which among the following contains the lowest amount of sugar?
1. Apple 2. Mango 3. Potato 4. Banana
41. The Family Courts (Amendment) Bill was introduced in Lok Sabha on July 18, 2022. Under this act, which of the following states has set up family courts?
1. Himachal Pradesh 2. Arunachal Pradesh
3. Assam 4. Gujarat
42. Which of the following organisations of the Government of India has been reporting the GDP at factor cost and market prices?
1. Reserve Bank of India
2. National Sample Survey Organisation
3. Central Statistics Office
4. NITI Aayog
43. Who founded the value of 'G' ?
1. Henry Cavendish. 2. Michael Faraday
3. Isaac Newton 4. Marie Curie
44. Which Indian musician served as the artistic director of the World Music Department at the Rotterdam Music Conservatory in the Netherlands?
1. Hariprasad Chaurasia 2. Pravin Godkhindi
3. Ronu Majumdar 4. Nityanad Haldipur
45. Identify the statement that is NOT true about ATP.
1. Nerve impulse propagation
2. Secretion of enzymes
3. Contraction of muscles 4. Protein synthesis
46. In how many categories does the Industrial Policy Resolution 1956 classified?
1. 3 2. 5 3. 6 4. 4
47. Which of the following Gupta ruler belonged to the iron pillar situated at Mehrauli, Delhi?
1. Skandagupta 2. Samudragupta
3. Kumaragupta 4. Chandragupta II
48. Vasco da Gama, a Portuguese explorer, discovered the sea route to India in _____.
1. 1488 2. 1498 3. 1508 4. 1518
49. Name the classical dancer who was given the Prani Mitra Award in 1968.
1. Da Padma Subrahmanyam
2. Shovana Narayan
3. Rukmini Devi Arundale 4. Bipin Singh
50. In August 2022, the Union government appointed _____ as a director in the Prime Minister's Office (PMO)
1. Gopal Vittal 2. Rajesh Verma
3. Anuj Poddar 4. Shweta Singh
51. Find the total surface of a cube whose volume is 343 m^3 .
1. 186 m^2 2. 294 m^2 3. 196 m^2 4. 210 m^2
52. Find the fourth proportional to the numbers 17, 272 and 19.
1. 332 2. 323 3. 403 4. 304
53. In a linear race of 500 m, A can beat B by 50 m and in a race of 600 m, B can beat C by 60 m. By how many metres will A beat C in a race of 400 m?
1. 70 2. 68 3. 76 4. 72
54. Raju, Sunil and Vishal can separately finish a work in 20, 30 and 40 days, respectively. In how many days Raju can finish the work, if he is assisted by Sunil and Vishal on alternate days, starting with Sunil?
1. $12\frac{3}{5}$ 2. $12\frac{1}{20}$ 3. $11\frac{1}{20}$ 4. $11\frac{3}{5}$
55. Mohit purchased a table for ₹ 1,260 and due to some scratches on its top, he sold it for ₹ 1,197. What is his loss per cent?
1. 7% 2. 4% 3. 6% 4. 5%
56. A student's marks were wrongly entered as 65 instead of 45. Due to this, the average marks for the class got increased by $\frac{1}{3}$. The number of students in the class is :
1. 40 2. 20 3. 60 4. 30
57. Study the following pie chart and answer the question that follows.
Percentage of different types of expenditures of a household
Year 2021
- 
- The difference in the expenditure on health and entertainment is what percentage of the expenditure on food?
1. 60% 2. 20% 3. 30% 4. 200%
58. The table given below shows the sales of bikes and cars of five companies.

Companies	Bike	Car
P	200	1200
Q	100	300
R	500	700
S	600	1000
T	800	800

J_1 = The average sale of bikes of company P, Q and R.
 J_2 = The average sale of cars of company R, S and T.
What is the value of $(J_1 : J_2)$?

1. 24 : 11 2. 8 : 25 3. 7 : 24 4. 25 : 8
59. Find the HCF of 4.08 and 6.63.
1. 0.50 2. 0.52 3. 0.51 4. 0.53
60. Which of the following will satisfy $a^2 = b^2 + (ab)^2$ for the values of a and b ?
1. $a = \sin x, b = \cot x$ 2. $a = \cos x, b = \tan x$
3. $a = \cot x, b = \cos x$ 4. $a = \sin x, b = \tan x$
61. 7 is added to a certain number and the sum is multiplied by 5. The product is then divided by 3 and 4 is subtracted from the quotient. If the result comes is 16, then what is the original number?
1. 3 2. 1 3. 5 4. 4
62. $\theta = 135^\circ; y = 15^\circ$.
What is the value of $2 \cos(\theta) \sin(y)$?
1. $\frac{\sqrt{3}-1}{2}$ 2. $\frac{1-\sqrt{3}}{2}$ 3. $2-\sqrt{3}$ 4. $\sqrt{3}-2$

Quantitative Aptitude

51. In the first year, the population of a town decreased by 5% due to the Corona virus first wave. In the next year, it decreased again by 5% due to the second wave and in the third year, it increased by 5%. At the end of the third year, the population was 9,24,625. What was the population at the beginning of the first year?
1. 7,00,000 2. 10,00,000 3. 8,97,933 4. 9,92,519
52. A shopkeeper claims to sell his articles at a discount of 10%, but marks his articles by increasing the cost of each by 20%. His gain percentage is:
1. 18% 2. 12% 3. 8% 4. 16%

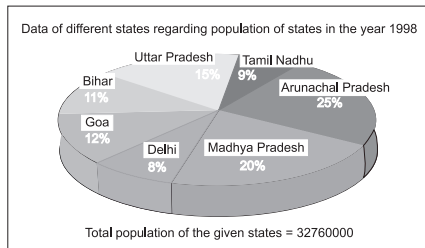
65. If $abc = 5$, what is the value of

$$\left(\frac{1}{1+a+b^{-1}} + \frac{1}{1+b+5c^{-1}} + \frac{1}{1+\frac{c}{5}+a^{-1}} \right) ?$$

1. 5 2. 1 3. $\frac{1}{5}$ 4. $(a + b + c)$
66. If $\sec x - \cos x = 4$, then what will be the value of $\frac{(1 + \cos^2 x)}{\cos x}$?

1. 9/4 2. 1/4 3. $2\sqrt{5}$ 4. $\sqrt{5}$

67. Study the given graph and answer the following question.
Lorem ipsum



Sales	Sex and literacy wise Population Ratio			
	Sex		Literacy	
	M	F	Literate	Illiterate
Arunachal Pradesh	5	3	2	7
Madhya Pradesh	3	1	1	4
Delhi	2	3	2	1
Goa	3	5	3	2
Bihar	3	4	4	1
Uttar Pradesh	3	2	7	2
Tamil Nadu	3	4	9	4

What was the ratio of the number of females in Arunachal Pradesh to the number of females in Uttar Pradesh?
1. 21 : 50 2. 25 : 16 3. 16 : 25 4. 50 : 21

68. The radius of a circle is 5 cm. Calculate the length of a tangent drawn to this circle from a point at a distance of 10 cm from its centre.
1. $5\sqrt{5}$ cm 2. $5\sqrt{2}$ cm 3. 3 cm 4. $5\sqrt{3}$ cm

69. A hollow sphere has an outer radius of 6 cm and inner radius of 3 cm. What is the volume of this hollow sphere ?
1. 252π cm³ 2. 356π cm³ 3. 144π cm³ 4. 175π cm³

70. A certain amount will become six times in 20 years. How long does it take for the same amount to become 5 times? Assume the same rate of simple interest in each case.
1. 16 years 8 months 2. 15 years 8 months
3. 15 years 4. 16 years

71. The table given below shows the earnings of two persons on five different days.

Days	Earnings	
	A	B
Tuesday	85	130
Wednesday	76	90
Thursday	45	102
Friday	95	86
Saturday	110	48

What is the difference between the total earnings of A and B on all the five days?

1. 45 2. 35 3. 50 4. 55
72. If the angles of a triangle are $(x - 6)$ degrees, $(x + 26)$ degrees and $8x$ degrees then what is the value of $2x$?
1. 12 degrees 2. 16 degrees 3. 48 degrees 4. 32 degrees
73. If $4(z + 7)(2z - 1) = Az^2 + Bz + C$, then the value of $A + B + C$ is:
1. 28 2. 32 3. 74 4. 81
74. In a ΔABC , AD, BE and CF are the medians from vertices A, B and C, respectively. The point of intersection of AD, BE and CF is called _____.
1. median point 2. orthocentre
3. centroid 4. incentre
75. Factorize the following expression: $p^3 + 27$
1. $(p - 3)(p^2 - 3p + 9)$ 2. $(p + 3)(p^2 + 3p + 9)$
3. $(p + 3)(p^2 - 3p + 9)$ 4. $(p + 3)(p^2 - 3p - 9)$

English Comprehension

76. Select the correct passive form of the given sentence.
Did he do his mission?
1. Was his mission done by him?
2. Was his mission do by him?
3. Was his mission being done by him?
4. Had his mission been done by him?
77. Select the option that expresses the given sentence in active voice.
Does she know me?
1. Am I known by her? 2. Is she known to me?
3. is she knows by me? 4. Am I known to her?
78. Select the most appropriate antonym of the given word.
Hazard
1. Peril 2. Jeopardy 3. Protection 4. Danger
79. Select the most appropriate synonym of the underlined word in the given sentence.
The wrestler retaliated the blow that he received.
1. respected 2. welcomed
3. reciprocated 4. forgave
80. Choose the incorrectly spelt word.
1. Contradiction 2. Abhorrent
3. Condencing 4. Hereditary
81. Select the incorrectly spelt word.
1. Bouquet 2. Hygene 3. Mortgage 4. Champagne
82. Select the most appropriate meaning of the given idiom.
On cloud nine
1. Flying 2. Floating 3. Dreaming 4. Very happy
83. Select the most appropriate synonym of the underlined word in the given sentence.
The professor refused to comment on the erroneous description of the historical events in the journal
1. suitable 2. lucid 3. inaccurate 4. sensitive
84. Select the option that can be used as a one-word substitute for the given group of words.
An exaggerated statement is not to be taken seriously or literally
1. Hypertext 2. Hyperbole 3. Hypocrisy 4. Hippocrates
85. Sentences of a paragraph are given in jumbled order. Arrange the sentences in the correct order to form a meaningful and coherent paragraph.
A. Dozens of distinctly different regional languages are spoken in India, which shares many characteristics such as grammatical structure and vocabulary.
B. India has a longer exposure to English than any other country which uses it as a second language,

Answers with Explanations

General Intelligence and Reasoning

1. Option (4) is the correct.

Explanation: Given that: $59 * 12 * 6 * 24 * 2 * 105$

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

By checking options one by one and interchanging accordingly.

1. -, +, -, +, =

$$59 - 12 + 6 - 24 + 2 = 105$$

$$67 - 36 = 105$$

$$31 \neq 105$$

2. ×, -, +, ×, =

$$59 \times 12 - 6 + 24 \times 2 = 105$$

$$708 - 6 + 48 = 105$$

$$756 - 6 = 105$$

$$750 \neq 105$$

3. +, ×, +, -, =

$$59 + 12 \times 6 + 24 - 2 = 105$$

$$59 + 72 + 24 - 2 = 105$$

$$155 - 2 = 105$$

$$153 \neq 105$$

4. -, ÷, +, ×, =

$$59 - 12 \div 6 + 24 \times 2 = 105$$

$$59 - 2 + 24 \times 2 = 105$$

$$59 - 2 + 48 = 105$$

$$107 - 2 = 105$$

$$105 = 105$$

2. Option (2) is the correct.

Explanation:

F + M means 'F is the husband of M'

F ÷ M means 'F is the daughter of M'

F - M means 'F is the father of M'

F × M means 'F is the mother of M'

Now,

U Husband → V Mother → K Father → B

Family tree:

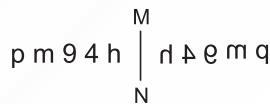


3. Option (2) is the correct.

Explanation:

Logic: In the mirror image the left becomes right and the right becomes left.

Now, mirror image of



4. Option (2) is the correct.

Explanation:

T	N	Δ	N	?
A O Z	Δ T A	O A T	E Δ O	
N	O	N	A	

Logic:

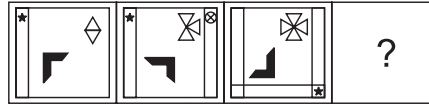
T	N	Δ	N	?
A O Z	Δ T A	O A T	E Δ O	
N	O	N	A	

Similarly, follow the pattern:

E
A O Δ
N

5. Option (1) is the correct.

Explanation:



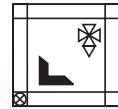
Logic:

1. L-shaped figure is rotated by 90 degrees in a clockwise direction in each step.

2. At every step, a very small figure is added at the right topmost corner, right bottom corner, and left bottom corner respectively.

3. Also, in each step, an extra line is being added on one side of the square.

4. Further, the number of counts of smaller triangle shown in the figure is increasing with every step.



6. Option (4) is the correct.

Explanation:

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

12	11	3
L	K	C
↓ -1	↓ +2	↓ +1
K	M	D
11	13	4
↓ -1	↓ +2	↓ +1
J	O	E
10	15	5
↓ -1	↓ +2	↓ +1
I	Q	F
9	17	6
↓ -1	↓ +2	↓ +1
H	S	G
8	19	7

7. Option (3) is the correct.

Explanation:

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,

A	B	A	S	E
1	2	1	19	5
↓ -1	↓ +3	↓ -1	↓ +3	↓ -1
Z	E	Z	V	D
26	5	26	22	4

Similarly,

B	A	N	D	S
2	1	14	4	19
↓ +3	↓ -1	↓ +3	↓ +3	↓ +3
E	Z	Q	G	V
5	26	17	7	18

Logic: -1 is subtracted from A & alternate odd numbers alphabets L.C. A, E, I, M, Q, U, X. And other Alphabets +3 is added.

So,

C	A	B	I	N
3	1	2	9	14
↓ +3	↓ -1	↓ +3	↓ -1	↓ +3
F	Z	E	H	Q
6	26	5	8	17

8. **Option (1) is the correct.**

Explanation: 37, 39, ?, 242, 970, 4852

Logic is as follows:

$$37 \xrightarrow{\times 1+2} 39 \xrightarrow{\times 2+2} 80 \xrightarrow{\times 3+2} 242 \xrightarrow{\times 4+2} 970 \xrightarrow{\times 5+2} 4852$$

9. **Option (1) is the correct.**

Explanation: (2, 4, 18) (1, 9, 50)

Logic:

(1st number + 2nd number)

$$\times \frac{1}{2} (\text{1st number} + \text{2nd number}) = \text{3rd number}$$

(2, 4, 18)

$$\Rightarrow (2+4) \times \frac{1}{2} (2+4) = 18$$

(1, 9, 50)

$$\Rightarrow (1+9) \times \frac{1}{2} (1+9) = 50$$

Similarly, (3, 5, 32)

$$\Rightarrow (3+5) \times \frac{1}{2} (3+5) = 32$$

10. **Option (1) is the correct.**

Explanation:

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

EGJM, GFLN, IENO, ?, MCRQ

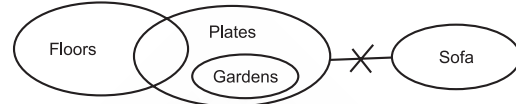
E	G	J	M
5	7	10	13
↓ +2	↓ -1	↓ +2	↓ +1
G	F	L	N
7	6	12	14
↓ +2	↓ -1	↓ +2	↓ +1

I	E	N	O
9	5	14	15
↓ +2	↓ -1	↓ +2	↓ +1
K	D	P	P
11	4	16	16

↓ +2	↓ -1	↓ +2	↓ +1
M	C	R	Q
13	3	18	17

11. **Option (4) is the correct.**

Explanation:



- Since there is no definite relation between floors and gardens. Hence, some floors being garden is possibly true.
- All gardens are plates and no plates are sofas. Hence, no garden is a sofa.
- Some plates are garden but cannot say about all.
- Some floors are not sofa but cannot say about all.

12. **Option (1) is the correct.**

Explanation:

A ÷ B means that A is the brother of B,

A × B means that A is the sister of B,

A - B means that A is the father of B

Since, P is the father of R hence, gender of P should be male (+).

Hence, only option 1, option 3 and option 4 shows P is male.

Now,

1. P - Q × R

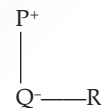
Family tree:

3. P ÷ Q × R

P⁺ - Q⁻

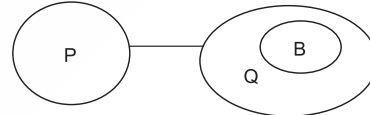
4. P × Q ÷ R

P⁻ - Q⁺



13. **Option (1) is the correct.**

Explanation: According to the question, following Venn diagram can be made.



- All B are Q and no P is Q. So, no P is B.
 - No Q is P. So, some Q are not P.
 - All B are Q.
- Hence, both conclusion I and II follows.

14. **Option (2) is the correct.**

Explanation: Given that:

(5, 35, 7)

(8, 32, 4)

The pattern followed here is: 1st term × 3rd term = 2nd term

$$(5, 35, 7) = 5 \times 7 = 35$$

Similarly,

$$(8, 32, 4) = 8 \times 4 = 32$$

Hence,

$$(3, 27, 9) = 3 \times 9 = 27$$

15. Option (2) is the correct.

Explanation:

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

Interchange × and -

- $7 \times 9 - 8 \div 2 + 6 = 25$
 $LHS = 7 - 9 \times 8 \div 2 + 6$
 $= 7 - 9 \times 4 + 6$
 $= 7 - 36 + 6$
 $= 13 - 36 = -23 \neq RHS$
- $8 \times 6 - 9 \div 3 + 10 = 0$
 $= 8 - 6 \times 9 \div 3 + 10$
 $= 8 - 6 \times 3 + 10$
 $= 8 - 18 + 10$
 $= 18 - 18 = 0 = RHS$
- $16 - 4 \div 2 + 8 \times 1 = 36$
 $LHS = 16 \times 4 \div 2 + 8 - 1$
 $= 16 \times 2 + 8 - 1$
 $= 32 + 8 - 1$
 $= 40 - 1 = 39 \neq RHS$
- $5 + 7 \times 3 - 4 \div 2 = 8$
 $= 5 + 7 - 3 \times 4 \div 2$
 $= 5 + 7 - 3 \times 2$
 $= 5 + 7 - 6$
 $= 12 - 6 = 6 \neq RHS$

16. Option (2) is the correct.

Explanation: Given that:

(99, 199, 1199)
 (15, 115, 1115)

The pattern followed here is: 1st term + 100 = 2nd term
 2nd term + 1000 = 3rd term

$$\begin{array}{ccc} 99, & 199, & 1199 \\ \underbrace{\hspace{1.5cm}}_{+100} & \underbrace{\hspace{1.5cm}}_{+1000} & \end{array}$$

Also,

$$\begin{array}{ccc} 15, & 115, & 1115 \\ \underbrace{\hspace{1.5cm}}_{+100} & \underbrace{\hspace{1.5cm}}_{+1000} & \end{array}$$

Similarly,

$$\begin{array}{ccc} 33, & 133, & 1133 \\ \underbrace{\hspace{1.5cm}}_{+100} & \underbrace{\hspace{1.5cm}}_{+1000} & \end{array}$$

17. Option (4) is the correct.

Explanation:

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

Interchange ÷ and +

- $18 \div 24 - 6 \times 6 + 3 = 32$
 $LHS = 18 + 24 - 6 \times 6 \div 3$
 $= 18 + 24 - 6 \times 2$
 $= 18 + 24 - 12$
 $= 42 - 12 = 30 \neq 32$
- $12 - 8 + 12 \times 9 \div 3 = 10$
 $LHS = 12 - 8 \div 12 \times 9 + 3$
 $= 12 - 0.66 \times 9 + 3$
 $= 12 - 5.94 + 3$

- $12 \div 8 \times 3 + 6 - 10 = 8$
 $LHS = 12 + 8 \times 3 \div 6 - 10$
 $= 12 + 8 \times 0.5 - 10$
 $= 12 + 4 - 10$
 $= 16 - 10 = 6 \neq 18$
- $7 + 21 \times 42 \div 14 - 9 = 19$
 $LHS = 7 \div 21 \times 42 + 14 - 9$
 $= 0.33 \times 42 + 14 - 9$
 $= 14 - 14 - 9 = 19 = RHS$

18. Option (1) is the correct.

Explanation:

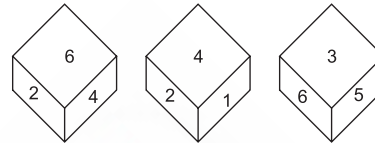


Figure 1 Figure 2 Figure 3

When 2 faces of dice are common then 3rd face will be opposite to each other.

From figures 1st and 2nd, 2 and 4 are common in both the dices. Hence, 6 and 1 are opposite to each other.

19. Option (2) is the correct.

Explanation:

'come home soon' is coded as '444',
 'are you coming' is coded as '336'
 'raining badly outside' is coded as '757'.

Logic: Number of letters in the word corresponds to the code of word. For example

Come = 4
 Hence,
 Kids are happy
 4 3 5 = 435

20. Option (3) is the correct.

Explanation: Given that:

Cells : Tissue :: Organs : ?

Tissue is made up of group of cells. Similarly, body is made up of group of organs.

Hence, Body is the correct answer.

21. Option (2) is the correct.

Explanation: Given that:

Librarian : Library

Librarian is in charge of library. Similarly, Priest is in charge of temple.

22. Option (2) is the correct.

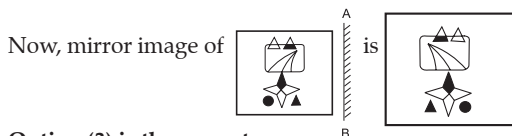
Explanation:

M	$\xrightarrow{-3 \text{ gives}}$	J	$\xrightarrow{-3}$	G
13		10		7
G	$\xrightarrow{-2 \text{ gives}}$	E	$\xrightarrow{-3}$	B
7		5		2
W	$\xrightarrow{-3 \text{ gives}}$	T	$\xrightarrow{-3}$	Q
23		20		17
O	$\xrightarrow{-3 \text{ gives}}$	I	$\xrightarrow{-3}$	I
15		12		9

23. Option (1) is the correct.

Explanation:

Logic: In the mirror image the left becomes right and the right becomes left.



24. **Option (3) is the correct.**

Explanation:

Employee	Employer	Emporium	Empress	Empty
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25. **Option (4) is the correct.**

Explanation:

- $12 - 142 = (12)^2 - 2 = 142$
- $8 - 62 = (8)^2 - 2 = 62$
- $4 - 14 = (4)^2 - 2 = 14$
- $14 - 192 = (14)^2 - 4 = 192$

General Awareness

26. **Option (1) is correct.**

Bhillasvamin towns was grown as a temple town during the Chola dynasty. Earlier, Bhillasvamin was also known as Vidisha, Bhelsa or Besnagar. It is a city in central Madhya Pradesh. The Chola dynasty was one of the longest ruling dynasties in South India. They ruled from 8th–12th century AD and was founded by Vijayalaya Chola. He led to the rise of the mighty Cholas by defeating the Pallavas. Cholas are known for their Dravida style of temple architecture. The famous temples are Brihadeshwara temple, Rajarajeshwara temple, Gangaikonda Cholapuram temple. The sculpture of Nataraja in the Tandava dance posture was an important and noted piece of sculpture produced during the reign of Cholas.

27. **Option (1) is correct.**

The major resources of Gondwana coal, which are metallurgical coal, are located in Damodar valley. Gondwana coal form 98% of the total reserves of Indian coal. It is said to be about 250 million years old. The coal is mainly bituminous and it needs to be converted into coal before using it.

Damodar valley lies along the Bihar–West Bengal border. It is the home to the largest coal mines of India. Raniganj is the oldest coal mine of India. Jharia is the largest coalfield of India. Besides coal fields are present in Bokaro, Giridh, Tatapani, Talcher, Karanpura, Korbha etc.

28. **Option (4) is correct.**

The ICC Women's Cricket World Cup 2022 was held in New Zealand. Eight teams had participated in the Cup. Australia had won the title and was crowned the winner after beating England in final by 71 runs.

29. **Option (4) is correct.**

Cows do not belong to the third trophic level. Food chain is a system of interdependencies and feeding relationship between organisms in a given environment. In this, energy and nutrients are transferred from one trophic level to other. The four main components of a food chain are Sun, Producers, Consumers, and Decomposers.

The sun is the primary source of energy for everything on this planet.

Producers are autotrophs such as algae, phytoplankton, green plants, Cyanobacteria that makes up the first level of a food chain. They produce their own food using energy of the sun.

Consumers are the organisms dependent on plants or other organisms for food. It is the largest part of food web and includes both herbivores and carnivores. Herbivores are primary consumers and carnivores are secondary consumers.

30. **Option (4) is correct.**

In 'Andes Mountain' of South America, Llamas is used for transportation. These are domesticated animals which

belongs to the family of camels. They are used to carry heavy loads in the cold regions. They have thick fur layer and hooves that help them to survive in the mountain region. The hooves helps them to climb and the fur keeps them warm.

Andes mountain are the longest continental mountain range with a length of 8900 km. They extend through seven South American countries: Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina.

31. **Option (3) is correct.**

The early Turkish rulers ruled between 1,206 and 1,290 over Delhi. Over this period, the Mamluk Dynasty, also known as slave dynasty was established by Qutb ud-Din Aibak in Delhi. Aibak was a Turkic Mamluk slave-general of the Ghurid Empire from Central Asia.

It was the first dynasty to rule as the Delhi Sultanate. It ended when Jalal ud din Firuz Khilji overthrew the last Mamluk ruler Muiz ud din Qaiqabad in 1290.

32. **Option (2) is correct.**

Surekha Punekar is a Lavani dancer form from the states of Maharashtra. Lavani is a popular dance form of Maharashtra which is a combination of traditional song and dance performed to the beats of a Dholki. It has a powerful rhythm and is performed by female dancers wearing a nine yard long saree.

Tamasha is a folk dance of Maharashtra which involves singing and dancing. It is performed by local or travelling theatre groups.

Povadas are Marathi ballads form that describes the events in the life of Shri Chhatrapati Shivaji Maharaj.

Koli is a popular folk dance of Maharashtra that is performed by fishermen of Koli caste. It depicts the lifestyle of fishermen.

33. **Option (4) is correct.**

The 15th Men's FIH Hockey World Cup will be held in the year 2023. It is being hosted by India. The matches are being held at the Kalinga Stadium in Bhubaneswar and Birsamunda International Hockey Stadium in Rourkela, Odisha. It is a quadrennial world championship for men's that is organised by the International Hockey Federation.

34. **Option (4) is correct.**

The core of the earth is made up of nickel, iron, and sulphur. The core is the innermost layer of Earth and is made of iron and nickel and is represented as NiFe. There are some elements that dissolve in iron and these are known as siderophiles. These are basically precious metals such as gold, cobalt, and platinum. The core can be divided into inner and outer core. The outer core has a temperature of 4,500° and 5,500° Celsius and the churning of NiFe in the core creates magnetic field. The inner core has a temperature of about 5,200° Celsius.

35. **Option (3) is correct.**

Prateeksha Kashi is not an exponent of Mohiniyattam classical dance form. Mohiniyattam is an Indian classical dance that derived its name from the word Mohini a historical enchantress avatar of the Hindu God Vishnu. This dance form was developed and remained popular in Kerala.

Prateeksha Kashi is a Kuchipudi dancer. Kuchipudi is a classical dance form of Andhra Pradesh.

36. **Option (2) is correct.**

Fundamental Rights are mentioned in part III of the Constitution of India. Articles 12–35 of the Indian constitution deals with these rights. There are six fundamental rights in India and these are:

Right to Equality-articles 14–18

Right to Freedom-Article 19–22

Right against Exploitation-Article 23–24

Right to Freedom of Religion-Article 25–28
Cultural and Educational Rights-Article 29–30
Right to Constitutional Remedies-(Article 32)

37. Option (3) is correct.

The famous hill station Udagamandalam is also known as Ooty. It is a city and municipality in the Nilgiris district, Tamil Nadu. It is also known as Queen of hill stations and is located in Nilgiri hills. It is the summer capital of Madras.

38. Option (1) is correct.

The Council of Ministers shall not exceed 15% of the total number of members of the Assembly of States. The provision came into existence with the 91st amendment act, 2003. The amendment led to the addition of clause 1A in Article 164.

Article 74 of the Indian Constitution deals with the status of the council of ministers.

Article 75 of the Indian constitution deals with the appointment, tenure, responsibility, qualification, oath and salaries and allowances of the ministers.

39. Option (1) is correct.

The United Nations Environment Programme has signed a Memorandum of Understanding with the Maharashtra government to support its 'Majhi Vasundhara'. This is an initiative towards sustainable use of energy and environmental development. The word 'Majhi Vasundra' means 'My Earth', which is an initiative of the Environment and Climate Change Department, Government of Maharashtra.

UNEP headquarters is located in Nairobi, Kenya, which was formed on 5 June 1972. It is responsible for coordinating responses to environmental issues within the United Nations system.

40. Option (3) is correct.

Potato has the lowest amount of sugar. The sugar content in 100 g potato is 0.82 g.

100 g of banana offers 12.23 g sugar. 100 g of mango has 14.8 g sugar. 100 g of apple has 10.39 g of sugar.

Sugar is a generic name for sweet tasting and water soluble carbohydrates. These can be simple carbohydrates like glucose, fructose, and galactose. They can be complex carbohydrates or compound sugars like sucrose, lactose, maltose, etc.

41. Option (1) is correct.

The Family Courts (Amendment) Bill was introduced in Lok Sabha on July 18 2022.

Under this act, a statutory cover was provided to family courts already established in Himachal Pradesh and Nagaland. The bill aimed to amend Family Courts Act, 1984.

The bills defines family court as special court which is mainly concerned with resolving family disputes. These were set with the objective of resolving family disputes in a humanitarian way separately from general criminal cases. This act also gives preference to a woman judge.

42. Option (3) is correct.

Central Statistics Office of the Government of India has been reporting the GDP at factor cost and at market price. Gross Domestic Product (GDP) can be calculated with two different methods.

Factor cost is the total value of the inputs that go into manufacturing a good. GDP at factor cost measures the cost to businesses to employ the four factors of production. GDP at market prices include the prices consumer will pay for the goods on the market.

43. Option (1) is correct.

Henry Cavendish founded the value of 'G' in 1798. It is a part of Newton's law and it is known as Gravitational constant.

The gravitation constant is equal to $6.67 \times 10^{-11} \text{ N}^2\text{m}^2\text{kg}^{-2}$.

He found the value by performing an experiment and the results were expressed as specific gravity of the Earth, or equivalently as the mass of the Earth.

44. Option (1) is correct.

Hariprasad Chaurasia served as the artistic director of the World Music Department at the Rotterdam Music Conservatory in the Netherland. He is an Indian classical flautist and music director who plays bansuri in the Hindustani classical tradition. He is a Padma Shri awardee and was also awarded with Padma Bhushan in 1992 and Padma Vibhushan in 2000.

45. Option (2) is correct.

Secretion of enzymes is NOT a function of ATP. ATP stands for Adenosine Tri Phosphate and is known as the energy currency of the cell. It consists of a nitrogenous base which is adenine, a ribose sugar, and three serially bonded phosphate groups. It was discovered in the year 1929 by German chemist Karl Lohmann. Besides providing energy, ATP is involved in the transportation of different molecules across cell membranes, muscle contraction, circulation of blood, locomotion and various body movements.

46. Option (1) is correct.

The Industrial Policy Resolution 1956, classified industries into 3 categories on the basis of ownership. It was based on Mahalanobis Model of growth. These three categories were:

- I. Government Enterprises or Schedule A Industries- These include 17 industries which were of basic and strategic importance.
- II. Mixed Enterprises or Schedule B industries- These include 12 industries that were owned by the states, which generally took the initiative in establishing new undertakings.
- III. Private enterprises or Schedule C industries- The industries that were not included in Schedule A or B.

47. Option (4) is correct.

The iron pillar situated at Mehrauli, Delhi belonged to Chandragupta II. It is 7.21 metres high and is 41 cm in diameter. It was constructed during the rule of Chandragupta II and is situated in Qutub complex at Mehrauli in Delhi. It is known as Kriti Stambha and is dedicated to Hindu deity Lord Vishnu. The oldest inscription on the pillar is of king Chandragupta II. He was also known as Chandragupta Vikramaditya, who was the most powerful emperors of the Gupta dynasty.

48. Option (2) is correct.

Vasco da Gama, a Portuguese explorer, discovered the sea route to India in 1498. He founds a direct sea route from Europe to India by going around Africa. This led to the establishment of trading stations at Calicut, Cochin, and Cannanore.

49. Option (3) is correct.

Rukmini Devi Arundale was a classical dancer who was given the Prani Mitra Award in 1968. She was a Bharatnatyam dancer and the first woman in Indian history to be nominated as the member of Rajya Sabha.

Padma Subrahmanyam is an Indian classical Bharatnatyam dancer. He is the founder and developer of dance form Bharata Nrithyam. She has received Padma Shri in 1981 and Padma Bhushan in 2003.

Shovana Narayan is an Indian Kathak dancer and Padma Shri awardee. She was trained under Pandit Birju Maharaj.

Bipin Singh is a dancer, choreographer, and director of Manipuri dance.

50. Option (4) is correct.

In August 2022, the Union government has appointed Shweta Singh as a director in the Prime Minister's Office (PMO). She

is an IFS officer and has been appointed for a period of three years. PMO office consists of the Prime Minister along with his staff. It is headed by Principal Secretary. At present, the Principal Secretary is Pramod Kumar Mishra. It was known as Prime Minister's Secretariat until 1977, when it was renamed during the Morarji Desai ministry.

Quantitative Aptitude

51. Option (2) is correct.

Let the population of the town at the beginning of first year = x

As given in the question,

$$x \times \frac{95}{100} \times \frac{95}{100} \times \frac{105}{100} = 9,47,625$$

$$\Rightarrow x = 9,47,625 \times \frac{100}{95} \times \frac{100}{95} \times \frac{100}{105} = 10,00,000$$

So, the population of the town at the beginning of first year = 1000000

52. Option (3) is correct.

Let the cost price of article = ₹ 100

Then, marked price of article = ₹ 120

After allowing a discount of 10%,

$$\text{The selling price of article} = 120 \times \frac{90}{100} = 108$$

$$\text{So, gain percentage} = \frac{108 - 100}{100} \times 100 = 8\%$$

53. Option (2) is correct.

Let the side of cube = s

We have,

$$\text{Volume of cube} = s^3$$

As given in the question,

$$\Rightarrow s^3 = 343$$

$$\Rightarrow s = 7$$

So, the total surface area of cube

$$= 6s^2 = 6 \times 7 \times 7 = 294 \text{ m}^2$$

54. Option (4) is correct.

Given numbers = 17, 272 and 19

Let the fourth proportional to the given numbers = x

As given in the question,

$$\Rightarrow \frac{17}{272} = \frac{19}{x}$$

$$\Rightarrow x = \frac{19 \times 272}{17} = 304$$

55. Option (3) is correct.

We have,

In a race of 500 m, A can beat B by 50 m.

So, ratio of distance covered by A and B = 500 : 450 = 10 : 9

In a race of 600 m, B can beat C by 60 m.

So, ratio of distance covered by B and C = 600 : 540 = 10 : 9

Ratio of distances covered by A, B and C

$$= (10 \times 10) : (9 \times 10) : (9 \times 9) \\ = 100 : 90 : 81 = 400 : 360 : 324$$

So, in a 400 m race, A will beat C by = 400 - 324 = 76 m

56. Option (1) is correct.

Time taken by Raju to finish the work alone = 20 days

Time taken by Sunil to finish the work alone = 30 days

Time taken by Vishal to finish the work alone = 40 days

Let the total work = LCM (20, 30, 40) = 120 units

Now, per day work of Raju = $\frac{120}{20} = 6$ units/day

$$\text{And per day work of Sunil} = \frac{120}{30} = 4 \text{ units/day}$$

$$\text{And per day work of Vishal} = \frac{120}{40} = 3 \text{ units/day}$$

Now, day 1 work by Raju and Sunil = 6 + 4 = 10 unit

Day 2 work by Raju and Vishal = 6 + 3 = 9 units

In every pair of days, they will do 19 units of work in the given fashion.

So, after 6 pair of days (12 days), remaining work

$$= 120 - 19 \times 6 = 6 \text{ units}$$

Time taken to finish 6 units of work by Raju and Sunil

$$= \frac{6}{10} = \frac{3}{5}$$

So, total time taken to finish the work

$$= 12 + \frac{3}{5} = 12\frac{3}{5} \text{ days}$$

57. Option (4) is correct.

Cost price of table = ₹ 1,260

Selling price of table = ₹ 1,197

$$\text{We have, Loss \%} = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100 \\ = \frac{1,260 - 1,197}{1,260} \times 100 \\ = \frac{63}{1,260} \times 100 = 5\%$$

58. Option (3) is correct.

Let the number of students in a class = x

Difference of marks entered wrongly = 65 - 45 = 20

As given in the question,

$$\Rightarrow \frac{20}{x} = \frac{1}{3}$$

$$\Rightarrow x = 60$$

So, number of students in class = 60

59. Option (1) is correct.

Let the total expenditure = ₹ 100

Then, difference between expenditure on health and entertainment = 26 - 14 = ₹ 12

Expenditure on food = ₹ 20

$$\text{Required percentage} = \frac{12}{20} \times 100 = 60\%$$

60. Option (2) is correct.

The average sale of bikes of company P, Q and R (J_1)

$$= \frac{200 + 100 + 500}{3} = \frac{800}{3}$$

The average sale of cars of company R, S and T (J_2)

$$= \frac{700 + 1000 + 800}{3} = \frac{2,500}{3}$$

$$\text{So, } \frac{J_1}{J_2} = \frac{800}{2,500} = \frac{8}{25}$$

61. Option (3) is correct.

We have,

$$\text{HCF}(4.08, 6.63) = \text{HCF}\left(\frac{408}{100}, \frac{663}{100}\right)$$

$$\text{HCF}\left(\frac{408}{100}, \frac{663}{100}\right) = \frac{\text{HCF}(408, 663)}{\text{LCM}(100, 100)} = \frac{51}{100} = 0.51$$

62. Option (3) is correct.

We have,

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

From given options, put $a = \cot x$ and $b = \cos x$ in the above equation,

$$a^2 = \cot^2 x$$

$$\text{and } b^2 + (ab)^2 = \cos^2 x + (\cot x \cdot \cos x)^2$$

$$= \cos^2 x + \cot^2 x \times \cos^2 x$$

$$= \cos^2 x (1 + \cot^2 x)$$

$$= \cos^2 x \cdot \operatorname{cosec}^2 x$$

$$= \cos^2 x \times \frac{1}{\sin^2 x}$$

$$= \cot^2 x$$

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

63. Option (3) is correct.

Let the number = x

As given in the question,

$$\Rightarrow \frac{5(x+7)}{3} - 4 = 16$$

$$\Rightarrow \frac{5(x+7)}{3} = 20$$

$$\Rightarrow x + 7 = 12$$

$$\Rightarrow x = 5$$

So, the number = 5

64. Option (2) is correct.

We have,

$$\theta = 135^\circ \text{ and } y = 15^\circ$$

$$\text{So, } 2 \cos \theta \cdot \sin y = 2 \cdot \cos 135^\circ \cdot \sin 15^\circ$$

As we know that, $2 \cos B \sin A$.

$$= [\sin(A+B) - \sin(A-B)]$$

$$\text{So, } 2 \cdot \cos 135^\circ \cdot \sin 15^\circ = [\sin(135^\circ + 15^\circ) - \sin(135^\circ - 15^\circ)]$$

$$= [\sin(150^\circ) - \sin(120^\circ)]$$

$$= [\sin(180^\circ - 30^\circ) - \sin(90^\circ + 30^\circ)]$$

$$= [\sin(30^\circ) - \cos(30^\circ)]$$

$$= \left[\frac{1}{2} - \frac{\sqrt{3}}{2} \right] = \frac{1 - \sqrt{3}}{2}$$

65. Option (2) is correct.

We have, $abc = 5$

Let $a = 1$, $b = 1$ and $c = 5$

$$\text{So, } \left(\frac{1}{1+a+b^{-1}} + \frac{1}{1+b+5c^{-1}} + \frac{1}{1+\frac{c}{5}+a^{-1}} \right)$$

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

$$= \left(\frac{1}{3} + \frac{1}{3} + \frac{1}{3} \right) = \frac{3}{3} = 1$$

66. Option (3) is correct.

We have, $\sec x - \cos x = 4$

$$\Rightarrow \frac{1}{\cos x} - \cos x = 4$$

$$\Rightarrow 1 - \cos^2 x = 4 \cos x$$

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

$$\text{So, } \cos x = \frac{-4 \pm \sqrt{(16+4)}}{2} = (-2 \pm \sqrt{5})$$

$$\text{So, } \frac{1 + \cos^2 x}{\cos x} = \frac{1}{\cos x} + \cos x$$

$$= \frac{1}{-2 + \sqrt{5}} + (-2 + \sqrt{5}) = \frac{-2 - \sqrt{5}}{(-2 + \sqrt{5})(-2 - \sqrt{5})} + (-2 + \sqrt{5})$$

$$= \frac{-2 - \sqrt{5}}{4 - 5} + (-2 + \sqrt{5}) = 2 + \sqrt{5} - 2 + \sqrt{5} = 2\sqrt{5}$$

67. Option (2) is correct.

We have,

Total population = 3,27,60,000

Number of females in Arunachal Pradesh

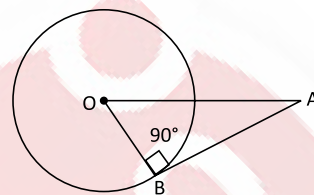
$$= \frac{1}{4} \times \frac{3}{8} \times 3,27,60,000 = 30,71,250$$

Number of females in Uttar Pradesh

$$= \frac{15}{100} \times \frac{2}{5} \times 3,27,60,000 = 19,65,600$$

Required ratio = 30,71,250 : 19,65,600 = 25 : 16

68. Option (4) is correct.



As shown in diagram,

ΔOAB is a right angle triangle with $\angle OBA = 90^\circ$.

By Pythagoras theorem,

$$OA^2 = OB^2 + AB^2$$

$$\Rightarrow 10^2 = 5^2 + AB^2$$

$$\Rightarrow AB = \sqrt{100 - 25}$$

$$\Rightarrow AB = 5\sqrt{3} \text{ cm}$$

69. Option (1) is correct.

We have,

Radius of outer sphere $r_1 = 6$ cm

Radius of inner sphere $r_2 = 3$ cm

We know that,

Volume of hollow sphere

$$= \frac{4}{3} \pi (r_1^3 - r_2^3)$$

$$= \frac{4}{3} \pi (6^3 - 3^3)$$

$$= \frac{4}{3} \pi (216 - 27)$$

$$= \frac{4}{3} \times \frac{22}{7} (189) = 792 \text{ cm}^3$$

70. Option (4) is correct.

Let the principal amount = ₹ P

So, total SI earned in 20 years = $6P - P = 5P$

As given in the question,

Total SI have to earn = $5P - P = 4P$

So, time taken to earn 4P as $SI = \frac{20}{5P} \times 4P = 16$ years

71. Option (1) is correct.

As shown in the table,

Total earnings of A on all five days

$$= 85 + 76 + 45 + 95 + 110 = 411$$

Total earnings of B on all five days

$$= 130 + 90 + 102 + 86 + 48 = 456$$

Required difference = $456 - 411 = 45$

72. Option (4) is correct.

We have,

Angles of triangle are $x - 6$, $x + 26$, and $8x$.

We know that, sum of all angles of a triangle = 180°

$$\text{So, } x - 6 + x + 26 + 8x = 180^\circ$$

$$\Rightarrow 10x = 180^\circ - 20^\circ$$

$$\Rightarrow x = 16^\circ$$

$$\text{So, } 2x = 16^\circ \times 2 = 32^\circ$$

73. Option (2) is correct.

We have,

$$4(z + 7)(2z - 1) = Az^2 + Bz + c$$

$$\Rightarrow 4(2z^2 + 13z - 7) = Az^2 + Bz + c$$

$$\Rightarrow 8z^2 + 52z + (-28) = Az^2 + Bz + c$$

Comparing both sides,

$$A = 8, B = 52 \text{ and } C = -28$$

$$\text{So, } A + B + C = 8 + 52 - 28 = 32$$

74. Option (3) is correct.

Given that, in a $\triangle ABC$, AD, BE and CF are the median from vertices A, B and C, respectively.

Point of intersection of the medians is called the centroid.

75. Option (3) is correct.

As we know that,

$$A^3 + B^3 = (A + B)(A^2 + B^2 - AB)$$

$$\text{So, } p^3 + 27 = p^3 + 3^3$$

$$= (p + 3)(p^2 + 3^2 - 3p)$$

$$= (p + 3)(p^2 + 9 - 3p)$$

English Comprehension

76. Option (1) is correct.

As the question begins with 'did', it should begin with the helping verb in past tense 'was/were'. The sentence structure will be 'helping verb + noun/pronoun + past participle + doer?'

- (1) This option has the correct sentence structure.
- (2) This option does not use the 3rd form of verb or past participle.
- (3) This option uses the past continuous tense, while the sentence is in past simple tense.
- (4) 'Had' can be used if the active voice sentence also begins with 'had'.

77. Option (4) is correct.

As the question begins with 'does', it should begin with the helping verb in present tense 'am/is/are'. Also, the subject of the active voice sentence becomes the object of the passive voice sentence. Similarly, the object of the passive voice sentence becomes the subject of the passive voice sentence.

- (1) The pronoun 'me' will remain the same and will not change into second person.
- (2) This option is incorrect because the subject and the object have not been reversed while changing the voice.
- (3) This option is incorrect because the subject and the object have not been reversed while changing the voice.
- (4) The preposition remains the same and the helping verb 'am' is used. The usage of preposition 'to' is correct.

78. Option (3) is correct.

'Hazard' is a danger or risk.

- (1) 'Peril' is serious and immediate danger.
- (2) 'Jeopardy' means danger of loss, harm, or failure.
- (3) 'Protection' is the action of protecting, or the state of being protected. It is the correct antonym of the given word.
- (4) 'Danger' is the possibility of suffering harm or injury.

79. Option (3) is correct.

'Retaliated' is to make an attack in return for a similar attack.

- (1) 'Respected' is to admire someone or something deeply, as a result of their abilities, qualities, or achievements.
- (2) 'Welcomed' is to greet someone arriving in a polite or friendly way.
- (3) 'Reciprocated' is to respond to a gesture or action by making a corresponding one. This is the correct synonym of the given word.
- (4) 'Forgave' is to stop feeling angry or resentful towards someone for an offence, flaw, or mistake.

80. Option (3) is correct.

- (1) 'Contradiction' is a combination of statements, ideas, or features which are opposed to one another.
- (2) 'Abhorrent' means inspiring disgust and loathing.
- (3) The correct spelling of the word is 'condensing', which means to make something denser or more concentrated.
- (4) 'Hereditary' refers to something that is related to or is based on inheritance.

81. Option (2) is correct.

- (1) 'Bouquet' is an attractively arranged bunch of flowers, especially one presented as a gift or carried at a ceremony.
- (2) The correct spelling of the word is 'hygiene', which means conditions or practices conducive to maintaining health and preventing disease, especially through cleanliness.
- (3) 'Mortgage' is a legal agreement by which a bank, building society, etc. lends money at interest in exchange for taking title of the debtor's property.
- (4) 'Champagne' is a white sparkling wine made in the old province of Champagne.

82. Option (3) is correct.

'On cloud nine' is to be extremely happy.

83. Option (4) is correct.

'Erroneous' is to be wrong or incorrect.

- (1) 'Suitable' means right or appropriate for a particular person, purpose, or situation.
- (2) 'Lucid' means easy to understand.
- (3) 'Inaccurate' means incorrect. It is synonymous to the given word.
- (4) 'Sensitive' is to be quick to detect or respond to slight changes, signals, or influences.

84. Option (2) is correct.

- (1) 'Hypertext' is a software system allowing extensive cross-referencing between related sections of text and associated graphic material.
- (2) 'Hyperbole' refers to exaggerated statements or claims not meant to be taken literally.
- (3) 'Hypocrisy' is the practice of claiming to have higher standards or more noble beliefs than is the case.
- (4) 'Hippocrates' was a Greek physician of the classical period who is considered as one of the most outstanding figures in the history of medicine.

85. Option (3) is correct.

Sentence D talks of when and how the English language came into India. When we look at the remaining sentences, we can say that sentence B is related to sentence D as sentence B talks of India having a longer exposure to English as compared to any other country that uses English as its second language. So, DB is a mandatory pair, which is only present in option (3). So, option (3) is the correct answer, and the correct sequence is DBCA.

86. Option (1) is correct.

The subject is already given. Both P, R and S begin with verb. Between the three, S is a better fit with the subject. Now, P talks of making a certain recommendation to someone/something,

which is mentioned in Q. So, PQ is a pair. Now, R talks of filtering the applicants' credentials; another verb should come after. So, PQ should come after R. This makes SRPQ the correct sequence. So, option (1) is the correct answer.

87. Option (3) is correct.

The correct phrase is 'beyond all our calculations', which suggests that the rate of interest was even more than what was calculated. The other options are incorrect.

88. Option (3) is correct.

'Instilled' is to gradually but firmly establish an idea or attitude in a person's mind.

- (1) 'Stopped' is to cease to happen.
- (2) 'Took out' is to escort someone to a social event or place of entertainment.
- (3) 'Inculcate' is to instil an idea, attitude, or habit by persistent instruction. It is the synonym of the given word.
- (4) 'Neglected' is to have suffered a lack of proper care.

89. Option (3) is correct.

'Someone's heart in the right place' means that someone has good intentions. So, option (4) is the correct answer.

90. Option (3) is correct.

When we talk about duration, we use the preposition 'in' or 'during'. 'By' is used to identify the agent performing an action, and it is irrelevant in the given context. So, option (3) is the correct answer. The correct phrase will be 'in three years'.

91. Option (1) is correct.

- (1) 'Abrogate' is to repeal or do away with a law, right, or formal agreement.
- (2) 'Cancellation' is to decide or announce that a planned event will not take place.
- (3) 'Ultimation' is the state of being ultimate.
- (4) 'Prorogation' is the action of discontinuing a session of a parliament or other legislative assembly without dissolving it.

92. Option (2) is correct.

When a clause with 'neither' or 'nor' is used after a negative clause, we invert the subject and the verb after neither and nor.

93. Option (2) is correct.

The blank should be filled by an adjective for weapons, which are considered a big threat to national security.

- (1) 'Heated' is to make warm or hot. It is inappropriate in the given context.
- (2) 'Deadly' means causing or able to cause death. This word fits in the required blank.
- (3) 'Casual' means relaxed and unconcerned. Weapons cannot be considered relaxed.
- (4) 'Valuable' means worth great deal of money. It does not convey the fact that the weapons are a big threat.

94. Option (2) is correct.

The direct speech is in present perfect continuous. So, the indirect speech will be in past perfect continuous.

- (1) The option uses past continuous tense.
- (2) The option uses past perfect continuous tense.
- (3) The option does not have the correct verb 'crying' here.
- (4) The second person of direct speech changes as per the object of reporting speech. So, 'your' turns into 'her'.

95. Option (1) is correct.

The sentence talks of an increase in orange prices, which is in contrast with more oranges being globally available. The blank should talk of the amount of oranges available.

- (1) 'Production' refers to the total amount of something that is produced.
- (2) 'Organisation' refers to the action of organising something. It is irrelevant to the context.

(3) 'Abduction' is the action of taking someone away by force or deception. It is incorrect in the given context.

(4) 'Assumption' is a thing that is accepted as true or as certain to happen, without proof. It is also irrelevant to the context.

96. Option (1) is correct.

The sentence talks of an action that started in the past and is still continuing. So, present perfect tense shall be used in the sentence. Also, the past participle 'been' is already present in the sentence.

- (1) 'Has been' is present perfect tense.
- (2) 'Had been' is past perfect tense.
- (3) 'Is' is present simple tense. Also, it is grammatically incorrect because past participle cannot be used with 'is'.
- (4) 'Was' is past simple tense. Also, it is grammatically incorrect because past participle cannot be used with 'was'.

97. Option (1) is correct.

The sentence suggests that the problem has become more serious now.

- (1) 'Acute' refers to an unpleasant or unwelcome situation or phenomenon present or experienced to a severe or intense degree. This is in line with the given context.
- (2) 'Rare' means not occurring very often. If the problem is rare, it will not be considered more serious.
- (3) 'Narrow' means limited in extent, amount, or scope. It is irrelevant in the given context.
- (4) 'Steep' means very large or rapid. It is used to describe rise, which is not explicitly mentioned.

98. Option (4) is correct.

If an issue has received publicity, most people would be aware of the issue.

- (1) 'Trouble' refers to difficulties or problems. It is irrelevant to the given context.
- (2) 'Affect' is to make a difference. It could be either positive or negative. So, it is incorrect.
- (3) 'Involved' is to participate in an activity or situation. We do not use the preposition 'about' after the verb 'involve'.
- (4) 'Concerned' is to be worried or anxious about something.

99. Option (4) is correct.

The blank is to be filled by an adjective for the decline in hunting of big-game for sport.

- (1) 'Probable' means likely to happen. It goes against the certainty conveyed by the sentence as 'one of the most gratifying developments'.
- (2) 'Advance' means done beforehand. It is incorrect in the given context.
- (3) 'Varied' means showing variation or variety. It is irrelevant in the given context.
- (4) 'Consequent' means following as a result or effect. This is relevant as it suggests that the decline in the hunting happened because of the strict laws.

100. Option (4) is correct.

The sentence talks of the condition of animals, which is contradictory to the fact that hunting has declined.

- (1) 'Danger' is the possibility of suffering harm or injury. The extinction in itself is the danger. So, it does not fit in the given structure.
- (2) 'Frighten' is to make someone afraid or anxious. It is irrelevant to the context.
- (3) 'Bullied' is to seek harm, intimidate, or coerce someone perceived as vulnerable. It doesn't fit in the context.
- (4) 'Threatened' is endanger or to cause something or someone to be at risk. This fits in the context as the entire paragraph is about saving wild animals from extinction.