

STAFF SELECTION COMMISSION

CGL TIER – I MODEL PAPER

No.of Questions: 100

Total Marks: 200

Time: 1 Hr.

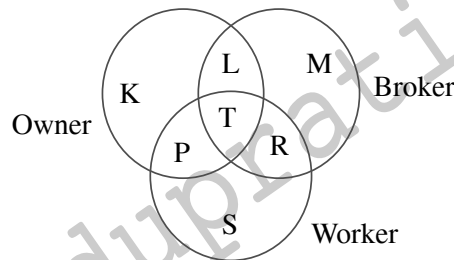
GENERAL INTELLIGENCE & REASONING

Directions (Q. 1 – 5): In each of the following questions, select the related letter/ word/ figure/ number from the given alternatives.

- Teacher : Student : : Religious leader : ?
1) Member 2) Disciple 3) Priest 4) God
- 182 : ? : : 210 : 380
1) 342 2) 272 3) 240 4) 156
- ADHM : ZWSN : : CFJO : ?
1) YVRM 2) WSPK 3) XUQL 4) ZXVT
- Smoke : Pollution : : Battle : ?
1) Victory 2) Peace 3) Treaty 4) Destruction
- 1) Mizoram 2) Sikkim 3) Kohima 4) Manipur

Directions (Q. 6 – 8): Find the odd word/ letter/ number from the given alternatives.

- 1) (117, 13) 2) (162, 18) 3) (171, 19) 4) (304, 16)
- 1) ACDF 2) TUOP 3) HIVW 4) FGIJ
- 1) Krishna 2) Cauvery 3) Narmada 4) Mahanadi
- The diagram given below represents owner, broker and worker. Identify the region which represents all the three i.e. owner, broker, worker:



- 1) L 2) T 3) P 4) R
- A man walks 1 km towards East then turns to South and walks 5 kms. Again he turns to East and walks 2 kms. Then he turns North and walks 9 kms. How far is he from the starting point?
1) 2 kms 2) 3 kms 3) 5 kms 4) 9 kms
- Pointing to a boy Sunita said "He is the son of my grandfather's only son". How is the boy related to Sunita?
1) Son 2) Uncle 3) Brother 4) Grandfather
- If PASSPORT is coded as RCUURQTV then how will BOOKLET be coded?
1) DQQMNVG 2) DQQMNGV
3) DRRNMGW 4) None of these

13. What fraction comes next in the sequence?

$$\frac{1}{2}, \frac{3}{4}, \frac{5}{8}, \frac{7}{16}, \frac{9}{32}, \frac{11}{64}, ?$$

- 1) $\frac{15}{72}$ 2) $\frac{13}{128}$ 3) $\frac{15}{125}$ 4) $\frac{18}{144}$

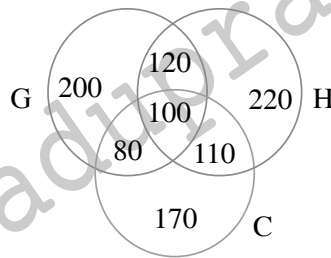
14. If Z = 52 and ACT = 48, then EAT will be equal to

- 1) 52 2) 48 3) 50 4) 54

15. Find the character which is different from the rest three

- 1) QPNK 2) AZXU 3) UTRN 4) SRPM

16. A result of a survey of 1000 students with respect to their knowledge of History (H), Geography (G) and Civics (C) is given below:



What is the ratio of those who know all the three subjects to those who know only Civics?

- 1) 1/9 2) 1/10 3) 5/27 4) 10/17

17. **Statements:** Some papers are pens.

All pencils are pens.

Conclusions: I. Some pens are pencils.

II. Some pens are papers.

- 1) Only I follows 2) Only II follows
3) Either I or II follows 4) Both I and II follows

18. Choose the word from the following which cannot be formed by using letters in the word:

RECOMMENDATION

- 1) MEDICINE 2) MEDIATE
3) REMINDER 4) COMMUNICATE

19. Arrange the following words in logical and meaningful order:

- a. Poverty b. Population c. Death d. Unemployment
e. Disease

- 1) b, c, d, e, a 2) c, d, b, e, a 3) b, d, a, e, c 4) a, b, c, d, e

Directions (Q. 20 – 21): Find the missing term in the series:

20. 125, 80, 45, 20, ?

- 1) 10 2) 8 3) 5 4) 3

21. AYBZC, DWEXF, GUHVI, JSKTL, ?

- 1) MQORN 2) MQNRO 3) NQMOR 4) QMONR

22. From the given options choose the missing number.

1) 676

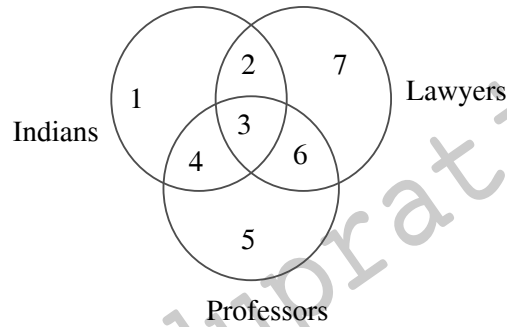
2) 625

3) 1100

4) 1000

3	4	5
6	8	10
216	512	?

23. Find out the number that shows those Indian Professors who are also lawyers?



1) 2

2) 3

3) 4

4) 6

24. To satisfy the mathematical equation $8 \times 2 + 3 - 5 = 21$, which two signs need to be interchanged?

1) + and -

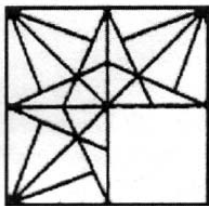
2) \times and +

3) \times and -

4) None

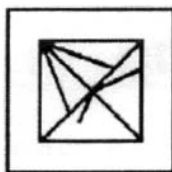
25. Identify the figure that will complete the pattern of the question figure?

Question figure:

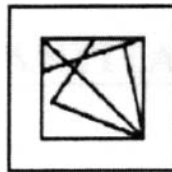


Answer figures:

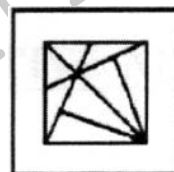
1)



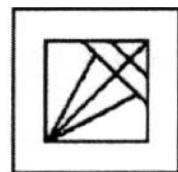
2)



3)



4)



GENERAL AWARENESS

26. Which of the following countries has launched a major expansion of the Suez Canal ?

1) Syria

2) Egypt

3) Lebanon

4) None of these

27. Permanent Revenue Settlement of Bengal was introduced by

1) Clive

2) Hastings

3) Wellesley

4) Cornwallis

28. Where was the first cotton mill in India established?

1) Surat

2) Bombay

3) Ahmedabad

4) Coimbatore

29. World Autism Awareness Day is observed on which of the following dates?

1) April 2

2) March 30

3) April 3

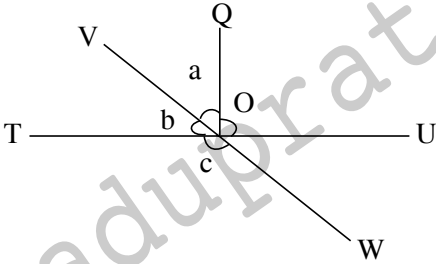
4) March 31

30. Which one of the following dynasties built the Khajuraho temple?
1) Chandellas 2) Chauhans 3) Paramaras 4) Tomars
31. The objective resolution was unanimously adopted by the constituent assembly on
1) 22nd January 1947 2) 26th November 1946
3) 1st October 1948 4) None of these
32. Where is the oldest working refinery located?
1) Bahamas 2) Basra 3) Digboi 4) Texas
33. Who was the first female to win the top pritzker architecture prize?
1) Zaha Hadid 2) Alejandro Aravena
3) Ryue Nishizawa 4) Kazuyo Sejima
34. Which are the two states (other than UP) having the highest representation in Lok Sabha?
1) Bihar and Madhya Pradesh 2) Maharashtra and West Bengal
3) Karnataka and Andhra Pradesh 4) Tamilnadu and Rajasthan
35. The equator cuts through which of the following islands?
1) Madagascar 2) Tasmania 3) Java 4) Borneo
36. Which theory is generally included under micro economics?
1) Price Theory 2) Income Theory
3) Employment Theory 4) None
37. The Preamble of the Indian Constitution has been taken from
1) British format constitution 2) Irish P-24 constitution
3) American constitution 4) French constitution
38. The foreign traveller who visited India during the Mughal period and who left us an expert's description of the peacock Throne was
1) Geronimo Verroneo 2) Omrah Danishmand Khan
3) Tavernier 4) Austin of Bordeaux
39. Singhbhum District is famous for
1) Coal 2) Iron 3) Copper 4) Aluminium
40. Once elected for a full term, a judge serves on the international court of Justice for
1) Five years 2) Six years 3) Nine years 4) Ten years
41. When ice melts in a beaker of water, the level of water in beaker till
1) increases 2) decreases
3) remains same 4) first increases then decreases
42. What does SDLC mean in Networking protocol?
1) Software Data Link Control
2) Synchronous Data Link Control
3) Software Development Life Cycle
4) Synchronous Data Development Cycle

43. A sprayer works on the principle of
1) Newton 2) Archimedes 3) Boyle 4) Pascal
44. The function of protem speaker is to
1) conduct the proceeding of the house in the absence of speaker
2) officiate as speaker when a speaker is unlikely to be elected
3) swearing in members and hold charge till a regular speaker is elected
4) check if the election certificates of members are in order
45. Cultivation of wheat requires
1) moderate temperature and heavy rains
2) humid temperature and heavy rains
3) humid temperature and moderate rains
4) moderate temperature and moderate rains
46. Which one of the following states produces the maximum manganese in India?
1) Madhya Pradesh 2) Andhra Pradesh
3) Uttar Pradesh 4) Orissa
47. New Britain and New Ireland are parts of
1) USA 2) Canada
3) Australia 4) Papua New Guinea
48. Under the Constitution, the power to issue a Writ of Habeas Corpus is vested in
1) High court alone
2) Supreme court alone
3) Both Supreme court and High court
4) District court & all other courts above them
49. Chemical which causes bone cancer and degeneration of tissue is
1) I - 131 2) Ca - 40 3) I - 127 4) Str - 90
50. Which of the following states was first to adopt the Panchayati Raj?
1) Andhra Pradesh 2) Bihar 3) Gujrat 4) Rajasthan

QUANTITATIVE APTITUDE

51. A fruit seller buys apples at the rate Rs. 60/100. He spent 15% on transportation then find the selling price of 100 fruits to get 20% profit?
1) Rs.72 2) Rs.81.8 3) Rs.82.8 4) Rs. 83.8
52. A man purchased 2 goats at Rs.1008. He sells first goat at 20% loss and second goat at 44% profit. If the selling price of each goat is equal then find the cost price of goat which is sold at loss.
1) Rs.648 2) Rs.360 3) Rs.568 4) Rs.440
53. It takes 6 days for 3 women and 2 men working together to complete a work. 3 men would do the same work 5 days sooner than 9 women. How many times does the output of a man exceed that of a woman?
1) 3 times 2) 4 times 3) 5 times 4) 6 times

54. A student was asked to multiply a number by $\frac{3}{2}$ but he divided that number by $\frac{2}{3}$. His result was 10 less than the correct answer. The number was
 1) 10 2) 12 3) 15 4) 20
55. Rs.6000 becomes Rs.7200 in 4 years at a certain rate of simple interest. If the rate becomes 1.5 times of itself, the amount of the same principal in 5 years will be
 1) Rs.8000 2) Rs.8250 3) Rs.9250 4) Rs.9000
56. At what rate of simple interest per annum will a sum become $\frac{7}{4}$ of itself in 4 years?
 1) 18% 2) $18\frac{1}{4}\%$ 3) $18\frac{3}{4}\%$ 4) $18\frac{1}{2}\%$
57. The average of nine consecutive numbers is n. If the next two numbers are also included the new average will
 1) increase by 2 2) remain the same
 3) increase by 1.5 4) increase by 1
58. If one pipe A can fill a tank in 20 minutes, then 5 pipes, each of 20% efficiency of A, can fill the tank in
 1) 8 min 2) 100 min 3) 20 min 4) 25 min
59. The number, whose square is equal to the difference of the squares of 75.15 and 60.12, is
 1) 46.09 2) 48.09 3) 45.09 4) 47.09
60. A dog is 50 of its own leaps behind a cat. The dog takes 5 leaps per minute to the cat's 4. If the dog and the cat cover 8 m and 5 m per leap respectively, what distance will the dog have to run before it catches the cat?
 1) 600 m 2) 700 m 3) 800 m 4) 1000 m
61. In the given figure, TU and VW intersect at point O. If $\angle QOU = 90^\circ$ and $a : b = 2 : 3$, then find the value of c.
- 
- 1) 48° 2) 54° 3) 113° 4) 126°
62. The average age of 9 students and their teacher is 16 years. The average age of the first four students is 19 years and that of the last five is 10 years. The teacher's age is
 1) 36 years 2) 34 years 3) 30 years 4) 28 years
63. The sum of three numbers is 98. If the ratio of the first to the second is 2 : 3 and that of the second to the third is 5 : 8, then the second number is
 1) 49 2) 48 3) 30 4) 20
64. Zinc and copper are in the ratio 5 : 3 in 400 gm of an alloy. How much of copper (in grams) should be added in the mixture to make the ratio 5 : 4?
 1) 50 2) 66 3) 72 4) 200

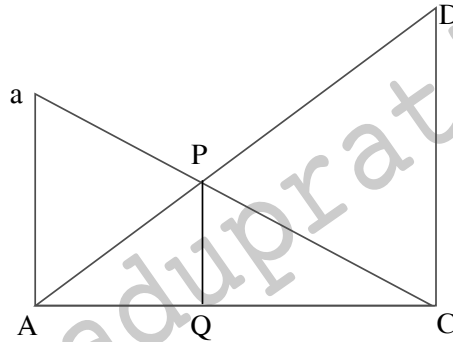
65. 5% of Nitya's income is equal to 15% of Ram's income. 10% of Ram's income is equal to 20% of Krishna's income. If the Krishna's income be 2000, then find the income of Nitya.

- 1) 25,000 2) 12,000 3) 15,000 4) 20,000

66. The population of city Alwar is 120000. The population of males and females are increased by 12% and 9% respectively. If at the end of the year the population is 132750, then find the difference between the no. of males and females.

- 1) 8000 2) 12000 3) 10000 4) 2750

67. In the given figure $AB \parallel CD \parallel PQ$, $AB = 12$ cm, $CD = 18$ cm and $AC = 6$ cm then the value of PQ is



- 1) $\frac{18}{5}$ cm 2) 9 cm 3) $\frac{36}{5}$ cm 4) $\frac{14}{5}$ cm

68. Find the length of the string bound on a cylindrical tank whose base diameter and height are $5\frac{1}{11}$ cm and 48 cm respectively. The string makes exactly four complete turns round the cylinder, while its two ends touch the tank's top and bottom.

- 1) 80 cm 2) 70 cm 3) 60 cm 4) 75 cm

69. If $\frac{4P}{P^2 - 4P + 8} = \frac{1}{8}$, $P \neq 0$ then the value of $P + \frac{4}{P}$ will be

- 1) 34 2) 37 3) 35 4) 36

70. If the angular diameter of the moon be 30, how far from the eye a coin of diameter 4.4 cm be kept to hide the moon?

- 1) 500 cm 2) 504 cm 3) 252 cm 4) 300 cm

71. Pankaj standing at a point P is watching the top of a tower which makes an angle of elevation of 30° . Pankaj walks some distance towards the tower and then his angle of elevation of the top of the tower is 60° . If the height of the tower is 30 m, then find the distance Pankaj moves.

- 1) $20\sqrt{3}$ m 2) $22\sqrt{3}$ m 3) 22 m 4) 20 m

72. If $x = 2 + \sqrt{3}$, $y = 2 - \sqrt{3}$ then find the value of $\frac{x^2 + y^2}{x^3 + y^3}$?

- 1) $\frac{7}{26}$ 2) $\frac{7}{19}$ 3) $\frac{7}{38}$ 4) $\frac{8}{52}$

73. If $a + b + c = 2s$, then find the value of $(s - a)^3 + (s - b)^3 + 3(s - a)(s - b)c$

- 1) $2c^2$ 2) c^2 3) c^3 4) c

74. If $x = 2 - 2^{1/3} + 2^{2/3}$, then find the value of $x^3 - 6x^2 + 18x + 26$?

- 1) 45 2) 88 3) 48 4) 40

75. If $\cot\theta (1 + \sin\theta) = 4m$ and $\cot\theta (1 - \sin\theta) = 4n$ then $(m^2 - n^2) = ?$

- 1) m^2n^2 2) m^3n^3 3) m^2n 4) mn

ENGLISH LANGUAGE

Directions (Q. 76 – 78): Some part of the sentences have errors and some are correct. Find out which part of a sentence has an error. If a sentence is free from error, your answer is (4).

76. Supposing if/(1) you are arrested /(2) what will you do?/(3) No error/(4).

77. Shalini and Sid are good friends/(1) and we met /(2) each other often./(3) No error/(4).

78. I thought I would pass in the examination/(1) although I did not answer/(2) most of the questions correctly./(3) No error/(4).

Directions (Q. 79 – 80): Sentences given with blanks to be filled in with an appropriate word(s). Four alternatives are suggested for each question. Choose the correct alternative out of the four.

79. Gayle often hitting while in powerplay.

- 1) keep 2) goes on 3) had been 4) did

80. We must wait until our boss those suggested corrections for the question paper.

- 1) has given 2) will be giving 3) gives 4) would give

Directions (Q. 81 – 82): Out of the four alternatives, choose the one which best expresses the meaning of the given word.

81. **Affectation**

- 1) Boasting 2) Pretence 3) Pedantry 4) Euphemism

82. **Equanimity**

- 1) Temper 2) Composure 3) Affability 4) Humour

Directions (Q. 83 – 84): Out of the four alternatives, choose the word opposite in meaning to the given word.

83. **Infructuous**

- 1) Devious 2) Straight 3) Remote 4) Profitable

84. **Tentative**

- 1) Immediate 2) Urgent 3) Developed 4) Final

85. Four words are given in each question, out of which only one word is spelt correctly. Find the word spelt correct.

- 1) Conducive 2) Parception 3) Quartors 4) Subordinate

Directions (Q. 86 – 90): A sentence/ a part of the sentence is underlined / Bold. Below are given alternatives to the underlined / BOLD part at (1), (2), (3) which may improve the sentence. Choose the correct alternative. In case no improvement is needed your answer is (4).

86. Was his advice ever **any good to** you ?

- 1) a good for 2) a good about
3) about good to 4) No correction required

87. SBI **has still studied** the matter and is still collecting reports regarding the scam.

- 1) is still studying 2) has studied still
3) still has studied 4) No improvement

88. We cannot ignore the contribution of M.S. for bringing about change in our winning streak.
1) for bringing in 2) in bringing about 3) in bringing of 4) No improvement
89. No sooner he ordered for food than the waiter was ready with it.
1) No sooner had he order 2) He ordered no sooner
3) No sooner did he order 4) No improvement
90. The coach was quite sure that none of them were aware of the rule of the game.
1) were aware from 2) had aware of 3) was aware of 4) No improvement

Directions (Q. 91 – 95): In the following questions, out of the four alternatives, choose the one which can be substituted for the given sentence.

91. One who lends money at very high rates
1) Usurer 2) Anchor 3) Lender 4) Almanac
92. A home sickness and memories of the past
1) Nostalgia 2) Platonic 3) Interregnum 4) Facsimile
93. Animals which live in a flock
1) Fauna 2) Flora 3) Gregarious 4) Mammal
94. A place for the sick to recover health
1) Reservoir 2) Sanatorium 3) Lair 4) Den
95. Murder of king or queen
1) Parricide 2) Regicide 3) Suicide 4) Sororicide

Directions (Q. 96 – 100): Read the passage carefully and choose the best answer to each question out of the four alternatives.

PASSAGE

In most Western countries, it is required that every young man, when his education is complete, shall give three, four or five years to military service. He goes into barracks, is regimented and drilled, makes a unit in the standing army and passes out usually when his term is ended, becomes an efficient soldier, to remain for the rest of his life ready at any moment to join in the armed defence of his country.

96. In the passage, the author opines that
1) military training is more important than general education.
2) military training should precede college education since it builds up one's mental and physical abilities.
3) military training is as important as general training.
4) military training must be included in the curricula of schools and colleges
97. Military training is as important as mental training because
1) otherwise young men are useless.
2) it is good that every scholar should also be an efficient soldier and be available for the country's defence.
3) one gets a chance to live in barracks.
4) war has become a daily affair.

98. Every young man has to undergo military training because he can
- 1) get a job after such training
 - 2) supplement his general education according to his wish
 - 3) join the army whenever his country needs to be defended in war
 - 4) learn and practice discipline
99. Talking about turbulent Eastern, countries like India, military training of students should be made compulsory
- 1) to fight the anti-social elements in every village or town
 - 2) to make youth serve the nation during times of war and peace
 - 3) as it can solve the unemployment problem by providing more jobs
 - 4) to repress communal riots
100. The author, writing in the early part of twentieth century, does not seem to talk about the need of military training for women because
- 1) women's education was a new thing then.
 - 2) she thinks women are not physically strong enough to undergo military training.
 - 3) women taking part in military service is only a recent phenomenon.
 - 4) according to her, women should remain indoors.

KEY

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

HINTS & SOLUTIONS

1. Student follows the teacher and disciple follows the religious leader.

2. $182 \quad 342 \quad 210 \quad 380$
 $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 $13^2 + 13 \quad 18^2 + 18 \quad 14^2 + 14 \quad 19^2 + 19$

 5 5

3. As,

A D H M
 $\updownarrow \quad \updownarrow \quad \updownarrow \quad \updownarrow$ opposite
 Z W S N

Similarly,

C F J O
 $\updownarrow \quad \updownarrow \quad \updownarrow \quad \updownarrow$ opposite
 X U Q L

4. As smoke results pollution similarly battle results destruction.

5. Except Kohima, others are states.

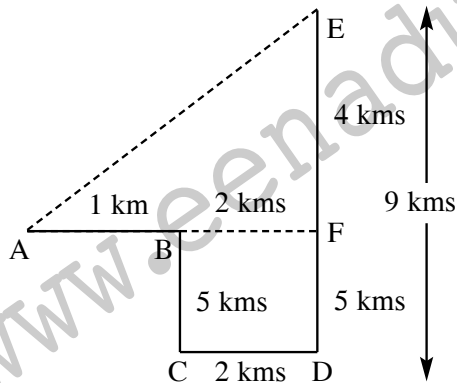
6. $117 \quad 13 \quad 162 \quad 18 \quad 171 \quad 19 \quad 304 \quad 16$
 $\swarrow \quad \swarrow \quad \swarrow \quad \swarrow$
 $\times 9 \quad \times 9 \quad \times 9 \quad \times 19$

7. (1) A C D F T U O P
 $\uparrow \quad \uparrow \quad \uparrow \quad \uparrow$
 $+2 \quad +2 \quad +1 \quad +1$
 H I V W F G I J
 $\uparrow \quad \uparrow \quad \uparrow \quad \uparrow$
 $+1 \quad +1 \quad +1 \quad +1$

8. Narmada falls in Arabian Sea where as the rest three falls in Bay of Bengal.

9. The region which represents all three i.e., owner, broker and worker is 'T'.

10.



AF = 3 kms, EF = 4 kms

$\therefore AE = \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5 \text{ kms}$

So, he is 5 kms away from the starting point.

11. Sunita's Grandfather's only son is his father and father's son is his brother.

12. As,

P	A	S	S	P	O	R	T
+2	+2	+2	+2	+2	+2	+2	+2
↓	↓	↓	↓	↓	↓	↓	↓
R	C	U	U	R	Q	T	V

So,

B	O	O	K	L	E	T
+2	+2	+2	+2	+2	+2	+2
↓	↓	↓	↓	↓	↓	↓
D	Q	Q	M	N	G	V

13. $\frac{1}{2}, \frac{3}{4}, \frac{5}{8}, \frac{7}{16}, \frac{9}{32}, \frac{11}{64}, ?$

Here we have two series

1st series:

1, 3, 5, 7, 9, 11, 13

2nd series:

2, 4, 8, 16, 32, 64, 128

So next term is $\frac{13}{128}$.

14. $Z = 52 = 2 \times (26)$

└─┬─> actual position in english alphabet

$ACT = 2 \times (1 + 3 + 20)$

└─┬─> actual position in english alphabet

$= 2 \times 24 = 48$

$EAT = 2 \times (5 + 1 + 20)$

└─┬─> actual position in english alphabet

$= 2 \times 26 = 52$

15. Q P N K A Z X U

↑	↑	↑	↑	↑	↑	↑
+	+	+	+	+	+	+
1	3	1	3	1	3	1

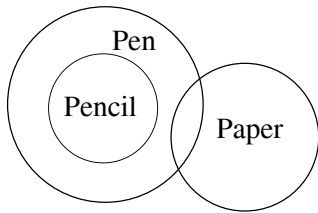
U	T	R	N	S	R	P	M
↑	↑	↑	↑	↑	↑	↑	↑
+	+	+	+	+	+	+	+
1	4	1	3	1	3	1	3

16. Number of people who know all three subjects = 100

Number of people who know only civics = 170

\therefore Required Ratio = $\frac{100}{170} = \frac{10}{17}$

17.



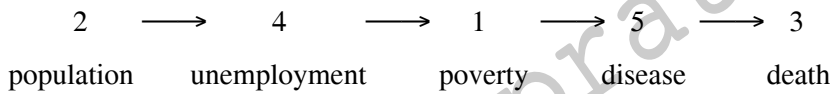
I. ✓

II. ✓

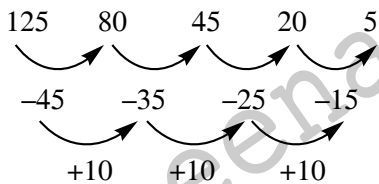
Both (I) & (II) follow.

18. The word 'COMMUNICATE' can't be formed from the word 'RECOMMENDATION' as we can't find the word 'U' in RECOMMENDATION.

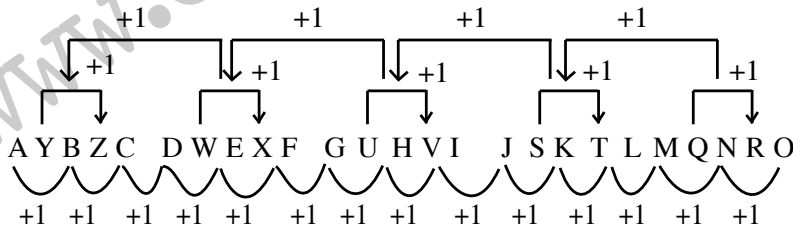
19. The correct order is-



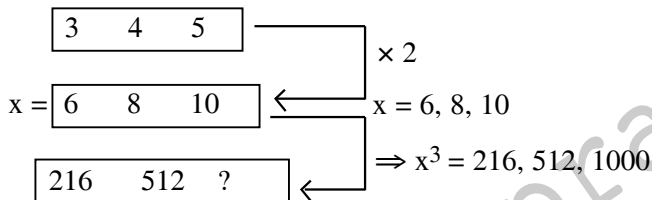
20.



21.



22.



So, ? = 1000

23. We can observe from the given diagram that number 3 represents Indian professors who are also lawyers.

24. Given equation:

$8 \times 2 + 3 - 5 = 21$

let us change 'x' and '-' signs then we have

$8 - 2 + 3 \times 5 = 8 - 2 + 15 = 23 - 2 = 21$

So, (3) is the right option.

51. Selling price = $60 \times \frac{115}{100} \times \frac{120}{100} = \text{Rs. } 82.8$

52. Let the cost price of each goat = Rs. 100

C.P		S.P	
1 st goat	→	100 _{x9}	$\xrightarrow{-20\%}$ 80 _{x9}
II nd goat	→	100 _{x5}	$\xrightarrow{+44\%}$ 144 _{x5}
			} same
∴ cost price of 1 st goat			
$= \frac{900}{1400} \times 1008 = \text{Rs.648}$			

53. Let the time taken by 3 men = x days

Time taken by 9 women = x + 5 days

3m = x day

$$2m = \frac{3x}{2} \text{ days}$$

Similarly, 9w = x + 5 days

3w = 3(x + 5) days

ATQ,

$$\frac{2}{3x} + \frac{1}{3(x+5)} = \frac{1}{6} \rightarrow \frac{2x+10+x}{3x(x+5)} = \frac{1}{6}$$

$$\Rightarrow 18x + 60 = 3x^2 + 15x$$

$$\Rightarrow 3x^2 - 3x - 60 = 0$$

$$\Rightarrow x^2 - x - 20 = 0$$

$$\Rightarrow x = 5$$

Time taken by 1 man = 3x = 3 × 5 = 15 days

Time taken by 1 women = 9(x + 5) = 90 days

Required output = 6 times

54. Let the given number be x.

Then,

$$\left(x \times \frac{3}{2}\right) - \left(x \div \frac{3}{2}\right) = 10$$

$$\Rightarrow \frac{3}{2}x - \frac{2}{3}x = 10 \Rightarrow \frac{9x-4x}{6} = 10$$

$$\Rightarrow 5x = 60 \Rightarrow x = 12$$

55. SI = Rs. (7200 - 6000) = Rs. 1200

$$\therefore \text{SI} = \frac{P \times R \times T}{100} \Rightarrow 1200 = \frac{6000 \times R \times 4}{100}$$

$$\Rightarrow R = \frac{1200 \times 100}{6000 \times 4} = 5\%$$

New rate of R = 5 × 1.5 = 7.5%

$$\text{Then, SI} = \frac{6000 \times 7.5 \times 5}{100} = \text{Rs.2250}$$

$$\therefore \text{Amount} = \text{Rs. } (6000 + 2250) = \text{Rs. } 8250$$

56. Let the principal be x

$$\therefore \text{Principal SI} = \frac{7x}{4}$$

$$\therefore \text{SI} = \frac{7x}{4} - x = \frac{3x}{4}$$

$$\begin{aligned} \text{Rate} &= \frac{\text{SI} \times 100}{\text{Principal} \times \text{Time}} \\ &= \frac{3x \times 100}{4 \times x \times 4} = 18 \frac{3}{4} \% \end{aligned}$$

57. Average of 9 consecutive no. = n

$$\therefore \text{Fifth number} = n$$

$$\text{Tenth number} = n + 5$$

$$\text{Eleventh number} = n + 6$$

$$\begin{aligned} \text{New average} &= \frac{9n + n + 5 + n + 6}{11} \\ &= \frac{11n + 11}{11} = \frac{(n + 1) \times 11}{11} = n + 1 \end{aligned}$$

58. Pipe A can fill a tank = 20 minutes

$$\text{Let the efficiency of pipe A} = 100$$

Then the efficiency of 5 new pipes

$$= 100 \times \frac{20}{100} \times 5 = 100$$

$$M_1 D_1 = M_2 D_2$$

$$\Rightarrow 20 \times 100 = 100 \times D_2$$

$$\Rightarrow D_2 = 20 \text{ min}$$

59. Let the number be x.

Then,

$$\begin{aligned} x^2 &= (75.15)^2 - (60.12)^2 \\ &= (75.15 + 60.12)(75.15 - 60.12) \\ &= 135.27 \times 15.03 = 2033.1081 \end{aligned}$$

$$\therefore x = \sqrt{2033.1081} = 45.09$$

60. Dog : Cat

$$\text{Leap/min} \quad 5 : 4$$

$$\text{Distance/ leap 8m} : 5m$$

$$\text{Speed} - 40 \text{ m/min} : 20 \text{ m/min}$$

Relative speed – 20 m/min

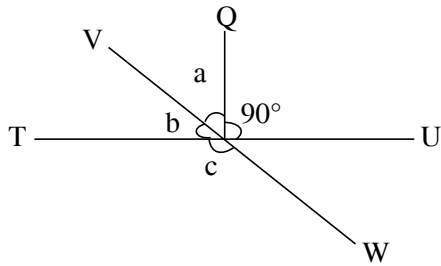
Actual distance b/w cat & dog

$$= 50 \times 8 = 400 \text{ m}$$

$$\text{Time taken by dog} = \frac{400}{20} = 20 \text{ min}$$

$$\text{Distance travelled by dog} = 20 \times 40 = 800 \text{ m}$$

61. $\angle a = 36^\circ$



$$\angle b = 54^\circ$$

$$\therefore \text{value of } \angle c = 180^\circ - 54^\circ$$

$$\Rightarrow \angle c = 126^\circ$$

62. Teacher's age

$$= 16 \times 10 - 19 \times 4 - 5 \times 10$$

$$= 160 - 76 - 50 = 34 \text{ years}$$

63. Let the numbers be x, y and z.

Then,

$$x : y = 2 : 3$$

$$y : z = 5 : 8$$

$$\therefore x : y : z = 2 \times 5 : 3 \times 5 : 3 \times 8 = 10 : 15 : 24$$

$$\text{Sum of the ratios} = 10 + 15 + 24 = 49$$

$$\therefore \text{The second number} = \frac{15}{49} \times 98 = 30$$

64. In 400 gm of alloy.

$$\text{Zinc} = \frac{5}{8} \times 400 = 250 \text{ gm}$$

$$\text{Copper} = \frac{3}{8} \times 400 = 150 \text{ gm}$$

x gm of copper be mixed, then

$$\frac{250}{150 + x} = \frac{5}{4} \Rightarrow 750 + 5x = 1000$$

$$\Rightarrow 5x = 1000 - 750 = 250$$

$$\Rightarrow x = 50 \text{ gm}$$

65. Given $5N = 15R$

$$N : R = 3 : 1 \text{ \& } 10R = 20K$$

R : K = 2 : 1

N : R : K

3 : 1_{x2} :

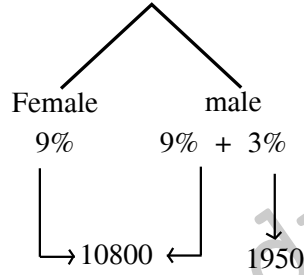
2 : 1

6 : 2 : 1 $\times 2000$

$\downarrow \times 2000$ $\downarrow 2000$

Nitya's income 12000

66. Total population \rightarrow 120000



Total population of male = 65000

\therefore No. of females = 67750

\therefore Required Diff. = 2750

67. $AB \parallel CD \parallel PQ$ (Given)

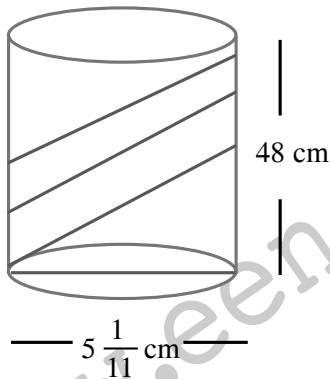
Let $AB = a$, $PQ = b$, $CD = c$

$$\therefore \frac{1}{b} = \frac{1}{a} + \frac{1}{c} \Rightarrow \frac{1}{b} = \frac{1}{12} + \frac{1}{8}$$

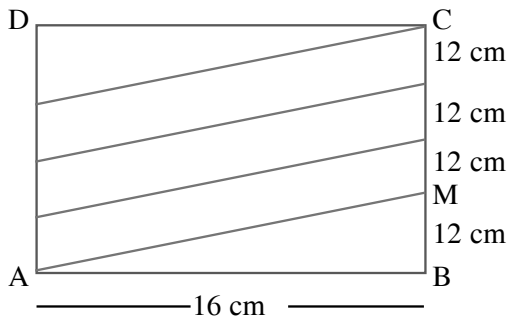
$$\Rightarrow \frac{1}{b} = \frac{3+2}{36}$$

$$\Rightarrow \frac{1}{b} = \frac{5}{36} \Rightarrow b = \frac{36}{5} \text{ cm}$$

68.



when we open it



The base circumference

$$= 2\pi r = 2 \times \frac{22}{7} \times \frac{56}{11} \times \frac{1}{2} = 16 \text{ cm}$$

\therefore AM = length of one complete turn

$$= \sqrt{16^2 + 12^2} = 20 \text{ cm}$$

\therefore total length = $4 \times 20 = 80 \text{ cm}$

69. Given $\frac{P^2 - 4P + 4}{4P} = 8$

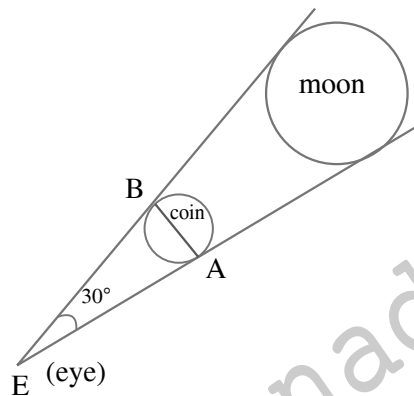
$$= \frac{P^2 - 4P + 4}{P} = 32$$

$$= \frac{P^2}{P} - \frac{4P}{P} + \frac{4}{P} = 32$$

$$\Rightarrow P - 4 + \frac{4}{P} = 32$$

$$\Rightarrow P + \frac{4}{P} = 36$$

70.



$$\theta = 30^\circ = \left(\frac{30}{60}\right)^\circ = \left(\frac{1}{2}\right)^\circ$$

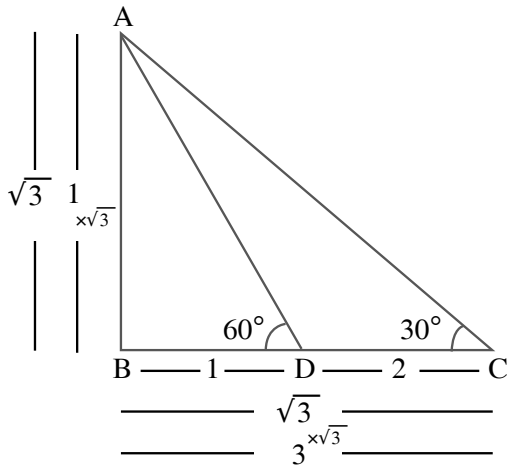
$$= \left(\frac{1}{2} \times \frac{\pi}{180}\right) \text{C} = \left(\frac{\pi}{360}\right) \text{C}$$

$$\theta = \frac{\text{Arc}}{\text{radius}} = \frac{\pi}{360} = \frac{4.4}{r}$$

$$\Rightarrow r = \frac{4.4 \times 360}{\pi} \text{ cm} = \frac{4.4 \times 360}{22} \times 7$$

$$r = 504 \text{ cm}$$

71.



$$\therefore AB = \sqrt{3} = 30 \text{ given}$$

$$\therefore CD = \frac{30}{\sqrt{3}} \times 2 = 20\sqrt{3}$$

72. $\therefore x = \frac{1}{y}$

$$\therefore x + \frac{1}{x} = 4$$

ATQ,

$$\frac{x^2 + y^2}{x^3 + y^3} = \frac{x^2 + \frac{1}{x^2}}{x^3 + \frac{1}{x^3}} = \frac{14}{52} = \frac{7}{26}$$

73. Let $a = b = c = 2$, then $2s = 6 \Rightarrow s = 3$

$$\begin{aligned} \therefore (s-a)^3 + (s-b)^3 + 3(s-a)(s-b)c \\ = (3-2)^3 + (3-2)^3 + 3(3-2)(3-2) \times 2 \\ = 1 + 1 + 3 \times 2 = 8 = c^3 \end{aligned}$$

74. Formula: $(B)^3 + 3(B)^2 - (B)^1 + (B)^2$
 $= B$ denotes base $= 2$
 $= (2)^3 + 3(2)^2 - (2)^1 + (2)^2$
 $= 8 + 12 - 2 + 4 = 22 + 26 = 48$

75. Assume $\theta = 45^\circ$

$$\text{then } 4m = 1 \times \left(1 + \frac{1}{\sqrt{2}}\right)$$

$$m = \frac{\sqrt{2} + 1}{4\sqrt{2}} \text{ and } n = \frac{\sqrt{2} - 1}{4\sqrt{2}}$$

$$\therefore m^2 - n^2 = \frac{1}{32} [(\sqrt{2} + 1)^2 - (\sqrt{2} - 1)^2]$$

$$= \left[\frac{1}{32} 4\sqrt{2} \right]$$

$$\Rightarrow (m^2 - n^2) = \frac{1}{32}$$

From options:

$$mn = \frac{\sqrt{2} + 1}{4\sqrt{2}} \cdot \frac{\sqrt{2} - 1}{4\sqrt{2}} = \frac{1}{32}$$

$$\therefore (m^2 - n^2) = mn$$

This model paper prepared by subject experts of RACE Institute, Hyderabad.

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