

MOCK CAT**ANSWERS**

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

EXPLANATIONS**Solutions 1 – 5:**

From the data given above, we can form the following table.

Bogie No.	Stop 1	Stop 2	Stop 3	Stop 4	Stop 5	Stop 6 (Starting point)
1					1 (1)	1 (2)
2				2 (1)	2 (2)	–
3			3 (1)		3 (2)	–
4		4 (1)		4 (2)	–	–
5	5 (1)				5 (2)	–
6			6 (1)	6 (2)	–	–
7					7 (1)	7 (2)
8		8 (1)		8 (2)	–	–
9			9 (1)		9 (2)	–
10	10 (1)			10 (2)	–	–
11					11 (1)	11 (2)
12		12 (1)	12 (2)	–	–	–
13					13 (1)	13 (2)
14				14 (1)	14 (2)	–
15	15 (1)		15 (2)		–	–
16		16 (1)		16 (2)	–	–
17					17 (1)	17 (2)
18			18 (1)	18 (2)	–	–
19				–	19 (1)	19 (2)
20	20 (1)	20 (2)		–	–	–
21			21 (1)		21 (2)	–
22				22 (1)	22 (2)	–
23					23 (1)	23 (2)
24		24 (1)	24 (2)	–	–	–

5 (1) means, the first person in 5th bogie.

Similarly, 24 (2) means second person in 24th bogie. If both the person's in the same bogie had got down already, there will be no person in that bogie to get down, even if the door is opened.

1. The number of persons getting down at starting point after 1 revolution is 7. **Answer: (2)**

2. The answer is 14. **Answer: (3)**

3. It is better to go with the options.

(1) 13th

Initial stop value of 13th bogie = $5 + 6 = 11$

If it is written 12 on 13th bogie also,

its stop value will become $2 + 3 = 5$

Change $11 - 5 = 6$

(2) 16th

Initial = $2 + 4 = 6$

If it is written 15th, then, $1 + 3 = 4$,

Change = $6 - 4 = 2$

(3) 20th

Initial value = $1 + 2 = 3$

If it is written 19th, then, $5 + 6 = 11$

Change = 8

(4) 24th

Initial = $2 + 3 = 5$

If it is written 23rd, then, $5 + 6 = 11$

Change = 6

So, the answer is 20th. **Answer: (3)**

4. We have to find the bogie numbers in which the doors will be opened at the adjacent stops.

The different such bogies are 2, 6, 7, 11, 12, 13, 14, 17, 18, 19, 20, 22, 23 and 24.

∴ Total number of ways = 14 **Answer: (2)**

5. We can add any number of bogies, but the two persons in that bogie should get down before stop 6.

So, we can add bogies up to the next prime number, that is, 29. So, we can add bogies numbered 25, 26, 27 and 28. Hence, we can add four more bogies. **Answer: (2)**

Solutions 6 – 10:

	Marks/Question	Negative marks/Question
Section 1	10	3
Section 2	8	2
Section 3	6	1

Each section has 5 questions.

So, the maximum possible marks are 120.

6. If a student leaves a question from section 3, he will secure $120 - 6 = 114$ marks, the highest possible score after 120 is. So, 115 is not possible to get. **Answer: (5)**
7. As mentioned above, the maximum possible marks are 114. **Answer: (2)**
8. Different combinations of answering questions correctly from the 3 sections are 4, 2, 5; 5, 2, 4; 5, 4, 2. (R = Right, W = Wrong, N.A. = Not attempted).

	Section – 1			Section – 2			Section – 3		
	R	W	NA	R	W	NA	R	W	NA
4, 2, 5	4	0	1	2	0	3	5	0	0
	4	1	0	2	1	2			
				2	2	1			
				2	3	0			
Possible scores	40, 37			16, 14, 12, 10			35		

	Section – 1			Section – 2			Section – 3		
	R	W	NA	R	W	NA	R	W	NA
5, 2, 4:	5	0	0	2	0	3	4	0	1
				2	1	2		1	0
				2	2	1			
				2	3	0			
Possible scores	50			16, 14, 12, 10			28, 27		

	Section – 1			Section – 2			Section – 3		
	R	W	NA	R	W	NA	R	W	NA
5, 4, 2:	5	0	0	4	0	1	2	0	3
					1	0		1	2
								2	1
								3	0
Possible scores	50			32, 30			14, 13, 12, 11		

So, different possible scores are

$$40 + 16 + 35 = 91$$

$$40 + 14 + 35 = 89$$

$$40 + 12 + 35 = 87$$

$$40 + 10 + 35 = 85$$

$$37 + 16 + 35 = 88$$

$$37 + 14 + 35 = 86$$

$$37 + 12 + 35 = 84$$

$$37 + 10 + 35 = 82$$

and

$$50 + 16 + 28 = 94$$

$$50 + 14 + 28 = 92$$

$$+ 12 + = 90$$

$$+ 10 + = 88$$

$$50 + 16 + 27 = 93$$

$$+ 14 + = 91$$

$$+ 12 + = 89$$

$$+ 10 + = 87$$

and

$$50 + 32 + 14 = 96$$

$$50 + 32 + 13 = 95$$

$$+ 12 = 94$$

$$+ 11 = 93$$

$$50 + 30 + 14 = 94$$

$$+ 13 = 93$$

$$+ 12 = 92$$

$$+ 11 = 91$$



(repeated)



(repeated)

(repeated)

(repeated)

(repeated)

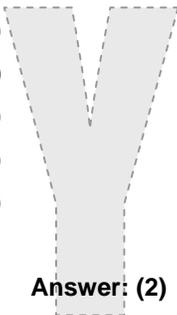
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So, different possible scores are 14. **Answer: (2)**

9. Maximum possible same score in section 1 and section 2 is 40. If he answers a question incorrectly in section 3, his score will be the maximum.

So, the maximum possible score is $40 + 40 + 23 = 103$. **Answer: (3)**

10. Maximum score is 120.

If a student does not attempt any question from section – 1, he will lose 10 marks, and if he answers it incorrectly, he will lose 13 marks.

So, different possible marks that he can lose are 10, 13, 8, 10, 7, 8.

i.e. 10, 13, 8, 7

He obtained 98 marks means he lost 22 marks.

The only possibility is $8 + 2 \times 7 = 22$.

So, he answered two questions incorrectly in section 3 and left a question in section – 2.

So, the answer is $15 - (2 + 1) = 12$ **Answer: (3)**

Solutions 11 – 13:

11. The students who secured more than 117 (39×3) marks obtained atleast 40 marks in at least one section.

So, Rajan, Subham and Gopi – 3 students. **Answer: (3)**

12. The maximum possible quant score for Gopi was $134 - \underbrace{(28 + 36)}_{\text{Cut offs in DI \& Verbal}} = 70$ **Answer: (3)**

13. If Rajan scored 22 in quant and 28 in DI, his score in verbal would be $122 - (22 + 28) = 72$, which was the maximum possible individual sectional score. **Answer: (2)**

Solutions 14 – 18:

14. Duration of day is the maximum in Ludhiana, i.e., 13 hrs 58 min and minimum is in Chennai, i.e., 12 hr 42 min.

So, the difference is 1 hr 16 min. **Answer: (4)**

15. Cool and Rainy cities are Bangalore, Delhi, Mumbai, Pune.

The difference between the average and the minimum temperature is half of the difference between the maximum and the minimum temperature.

And, It is minimum in Mumbai, i.e., $\frac{38 - 25}{2} = 6.5^\circ\text{C}$. **Answer: (2)**

16. 6 cities

Hyderabad, Bangalore, Delhi, Chandigarh, Ludhiana, Pune **Answer: (2)**

17. In Bangalore and Delhi, duration of day is not more than 13 hrs 25 min.

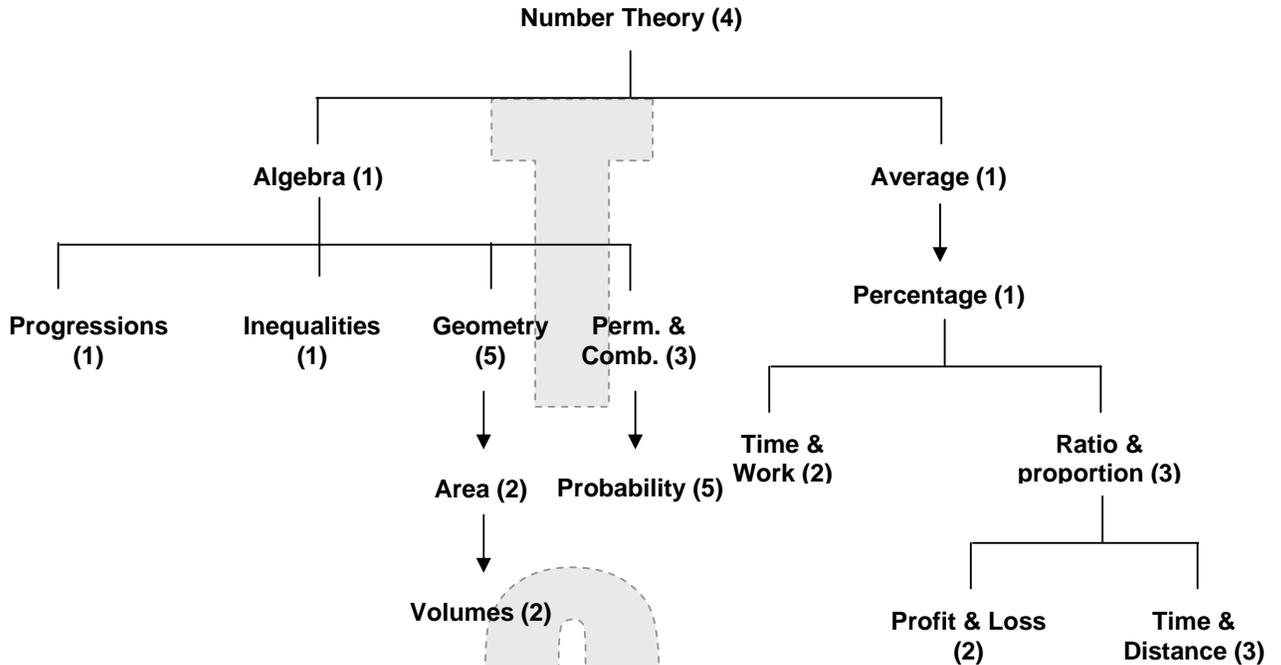
In Chandigarh, the humidity percentage is not more than 75.

So, the answer is Ludhiana. **Answer: (4)**

18. City value is the maximum for Delhi, i.e., 137. **Answer: (3)**

Solutions 19 – 23:

The given table can be presented in the form of tree as shown below.



19. Number theory, Algebra, Geometry and Areas. **Answer: (2)**

20. The minimum number of topics pending means the maximum number of topics has to be covered in 20 classes.

By observation, those all topics should be Number theory, algebra, Progressions, Inequalities, Average, Percentage, Time & Work, Ratio and Proportion and Profit and Loss and Time & Distance.

Total classes required to cover these topics is $4 + 1 + 1 + 1 + 1 + 1 + 2 + 2 + 3 + 2 + 3 = 20$

So, minimum number of topics pending is 5. **Answer: (2)**

21. Those 9 topics should be Number theory, Algebra, Average, Progressions, Inequalities, Percentage, Time & Work, Ratio and Proportion, Profit and Loss.

If we take these topics, then only we will get the minimum number of classes.

So, minimum number of classes = $4 + 1 + 1 + 1 + 1 + 1 + 2 + 2 + 3 + 2 = 17$ **Answer: (1)**

22. Areas cannot be the last topic because volume is based on areas. **Answer: (2)**

23. Number theory (4) + Algebra (1) + Geometry (5) + Perm & Comb (3) + Probability (5) + Areas (2)
Hence total 6 topics can be covered in the first 19 math classes. **Answer: (2)**

Solutions 24 – 27:

24. $6 + 8 + 3 + 9 + 17 + 6 + 5 = 54$ **Answer: (2)**

25. At least 2 subjects

⇒ Total teachers – teachers who teach only one subject

Total teachers = 138

Teachers who teach only one subject = $4 + 4 + 7 + 4 + 2 = 21$

So, the answer = $138 - 21 = 117$ **Answer: (1)**

26. Only 4 **Answer: (1)**

27. $(7 + 13 + 8 + 5 + 6 + 3 + 10 + 5 + 9 + 17 + 5) + (19 + 11 + 2) = 120.$ **Answer: (1)**

Solutions 28 – 30:

28. Option (1), Time

Total number of students = 35% of 13.2 + 25% of 6.4 + 20% of 5.7 + 20% of 13.8 + 15% of 16.4 + 20% of 4.5 + 25% of 5.5 = 14.855 (in thousands)

Similarly, we can find the number of students in all the coaching centres.

But, by simple observation, it is very clear that in **IMS** all the percentage figures are less than the other institutes. **Answer: (3)**

29. In B'LORE, it is $(30 - 20 = 10)\%$ of 6.4.

In DEL, $(40 - 20 = 20)\%$ of 13.8

LUD = 15% of 4.5

CHD = 30% of 5.5

In HYD, it is $(45 - 10 = 35)\%$ of 13.2. **Answer: (5)**

30. In HYD, students of GATE and CIVILS are 15% of 10% = 25%

In career corner, there are 35% of students. So, it is possible that all students of GATE & CIVILS may belong to career corner. And so is possible in B'LORE, DEL, and CHD.

So, it is possible in 4 cities; HYD, B'LORE, DEL and CHD. **Answer: (3)**

31. A hint can be taken from the concluding lines of the passage. 'We' refers to whom? This implies that somebody who offers goods and services is a mutual group; this word is 'professional' and has been introduced in (3) and (5). 'True' professionals are not related to the idea, hence (3) is the answer.

32. Option (1) makes no sense, and option (2) and (5) are irrelevant, hence eliminated. Option (3) is not justified in the passage. Therefore by PoE, (4) is the answer.

33. We need to choose an option that justifies as to why science as no effect on the ethical option (3) and (5) are not related to the passage (or) its contexts; hence it is eliminated as well. (4) is eliminated on the same ground. **Answer: (2)**
34. Going by PoE we can deduct the answer, (1) is eliminated as we do not know if 'very close' justifies the distance of mercury and sun. (3) and (4) are not related to the concept being discussed here, hence, eliminated. (5) can be inferred as the next sentence supports the expression 'Jupiter like distance'.
Answer: (5)
35. The preceding sentence distinguishes free education from slavery. It knows distinguishes scholarly learning from 'abstract concepts by the hoi polloi' or 'trivialities'. **Answer: (1)**
36. 'As well as causing' should be followed by a cause which is amiss. The sentence is awkward; therefore, (A) is an incorrect sentence. (B) is incorrect due to inappropriate tense usage. Past indefinite and present tense have been used in the same sentence. Therefore, (B) is also incorrect. The usage of 'in the morning' in (C) is repetitive. (D) has no error. **Answer: (2)**
37. Superlative degree has been used for comparison instead of the 'comparative' degree; therefore (A) is incorrect. (C) is incorrect as the usage of 'they' is ambiguous, the meaning is not clarified. (D) is incorrect as it uses the gerund where it is not required. **Answer: (1)**
38. 'Of' is a syntax error; therefore (A) is incorrect. (D) is also incorrect as 'period' should be used in plural as we are talking about three periods. **Answer: (4)**
39. Can one 'turn off' friends? (A) is incorrect. (C) is an awkward and a meaningless sentence, with the double usage of past perfect (had). **Answer: (2)**
40. In both the sentences, (C) and (D) an article is either missing or has been misplaced making the sentences meaningless or dangling. **Answer: (4)**
41. Statement 1 can be taken as an inference, based on information provided in statements 2 and 4, which are facts, based on verifiable data. Statement 3 is again fact-based as it talks about a debate and an action. **Answer: (3)**
42. Statement 1 refers to a stand based on inference, but for our purpose the statement made by a person ought to be treated as a fact. Statement 2 refers to the shortage of professionals in CDSCO and is a fact oriented data. Statement 3 also states a fact. Statement 4 refers to a conclusion based on a premise and this is related to an inference. **Answer: (5)**

43. The statement 1 refers to the budget speech and inference can be derived from the speech of the Finance Minister. Statement 2 is also inference based. Statement 3 refers to the decline of the Sensex that is factual. Statement 4 refers to the speech of the minister and is, therefore fact based.
Answer: (5)
44. Statement 1 refers to the introduction of means-cum-merit scholarship scheme in the Union Budget 2007 and is based on fact. Statement 2 refers to inference based on facts relating to new taxes. Statement 3 also ascribes reason to a fact and is, therefore, an inference. Statement 4 refers to the original statement of the Finance Minister and is, therefore, a given fact. **Answer: (2)**
45. Statement 1 refers to the observation of Moody's Investors' Service and thus constitutes a fact. Statement 2 refers to the author's judgment on Moody's analysis and so is a judgment. Statement 3 passes a judgment on the inflationary pressures and tax reduction. Statement 4 is an inference, based on certain admissions of policy makers. **Answer: (3)**
46. (1) The phrase 'under central government interference' renders the statement incorrect.
(2) This need not be a situation visualized in the question stem.
(3) The statement is correct as it deals with the theme of the passage.
(4) The situation may have been referred to in the passage, and the first part may also be correct. It is the second part of the statement that renders it incorrect.
(5) This need not be a situation visualized in the question stem. **Answer: (3)**
47. The stem of the question is about the working of IITs. So the right answer should also talk of their working.
(1) The statement lacks focus.
(2) This does not represent 'the working of the IITs'.
(3) This does not represent 'the working of the IITs'.
(4) This does not represent 'the working of the IITs'.
(5) The statement is correct as it describes that present state of all IITs'. **Answer: (5)**
48. All the answer options here may be partially correct. But a careful perusal of the paragraph, citing the example, shows that the author's intention is to refer to a two way mutually beneficial exchange virtually non-existent in the case of IITs in India. **Answer: (2)**
49. Statements (2) and (5) can be easily rejected as there is no 'own argument' and we cannot say that there is no conclusion. (3) and (4) are incorrect as the passage presents the symptoms, not the evidence in support of a point. The passage deplores the present situation due to lack of support, and expects nothing much due to absence of market orientation. **Answer: (1)**

50. Options (1) and (4) are easily ruled out because 'sylvan surroundings' are symbolic of the greenery of life and growth. (2) is obviously incorrect. Though (5) is stated next to the sentence using the phrase, what is implied and what also matches the central point is (3). **Answer: (3).**
51. (1) can be directly inferred from the opening couple of sentences of the passage. Hierarchical structure here implies the male orientation of the society in an effort to keep the female under the thumb of the male. This may not necessarily involve reversal of roles, as made out in (5). **Answer: (1)**
52. The statement reveals the difference between the biological and the ideological terms. (2) is rendered invalid by the word "polluted". This might be the opinion only of the anti-feminists, but not a general inference. **Answer: (1)**
53. The question asks: why the agenda of political liberty. The essence has been given in Kate Millet's quote given in the first paragraph. Options (1), (3) and (4) do not answer 'why'. Commitment to an agenda (5) also cannot strictly be taken to answer why. Unless the freedom comes, the power will not come. Hence, (2) **Answer: (2)**
54. (1) The features and the linkage are developed in the first two paragraphs and the contrast in the fourth.
(2) The author does not put forth his own ideas.
(3) There is no political discourse from the author. The word 'political' has been used in the context of the ideology of feminist movement.
(4) No study is presented.
(5) No study is presented. **Answer: (1)**
55. The question here is not what the phrase could mean, but why the author uses it. This naturally rules out (1), (2) and (3). The phrase has been used to reflect the opinion of Spender. The author does not agree with such phraseology, and uses the adjective 'testimony of clear intellectual dishonesty'. **Answer: (5)**
56. The answer can be directly derived from the lines in the first paragraph: "The mind of the artist is always at work, aiming at a definite purpose. He discerns within the visible world something more real than its outward appearance, some idea or form of the true, the good or the beautiful, which is more akin to the spirit itself than to the visible things".
(2) As per para 1, line 2 "poetic objectivity is not photographic realism"
(3) The answer is rendered invalid by the use of the phrase 'invisible phenomena'. Para 1 states that the poet discerns "within the visible world something more real than its outward appearance".
(4) Para I: "Poetic truth is a discovery, not a creation" renders the option incorrect.
(5) Emotions and passions do not 'enslave' an artist. **Answer: (1)**

57. (1) Poetic truth is not a creation.
 (2) Incorrect and irrelevant.
 (3) Poetic truth is not all about pleasures. The third para states: "The artist does not turn his back on the realities of the world. He knows its sorrows and sufferings as well as its virtues and its victories". Besides it is art, not science 'that gives us a heightened sense of reality'.
 (4) Incorrect and irrelevant.
 (5) The statement in para 3: "It (art) only gives a sense of the meaningfulness of life, evokes in us ideas of larger beauty, justice and reality of the universe" provides us with the answer. **Answer: (5)**

58. The negative connotation of 'apprehension of reality' renders I as incorrect. **Answer: (4)**

59. (1) Lacks focus.
 (2) There is no 'critical evaluation'.
 (3) The terms 'conceptual and the perceptual', though used in the passage, do not differentiate art and science.
 Out of (4) and (5), the latter is more coherent and intelligible expression of the central idea of the passage. **Answer: (5)**

60. Question (1) is answered in the opening sentence of para 2. (2) is answered in the last line of para 3. (4) is answered in para 2. (5) stands answered in the second and third line of para 3. **Answer: (3)**

61.

	Number of digits
$1001^1 = 1001$	$4 = 3 \times 1 + 1$
$(1001)^2 = 1002001$	$7 = 3 \times 2 + 1$
$(1001)^3 = 1003003001$	$10 = 3 \times 3 + 1$
$(1001)^n = 3 \times n + 1$	

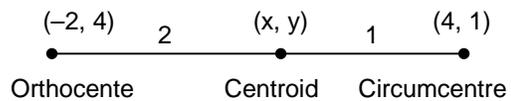
Hence, the number of digits in $(1001)^{1001} = 1001 \times 3 + 1 = 3004$ **Answer: (1)**

62. Centroid divides line joining orthocentre and circumcentre in 2 : 1.

Co-ordinates of centroid = (x, y)

$$= \left(\frac{-2 \times 1 + 2 \times 4}{3}, \frac{4 \times 1 + 1 \times 2}{3} \right) = (2, 2)$$

Answer: (3)



63. Total energy consumed = $\frac{\text{(Number of balls bowled)}}{\text{Speed of ball}} \times E$
 $= \frac{N}{V} (V^3 - 22V^2 + 125V)$
 $= N(V^2 - 22V + 146) = N[(V - 11)^2 + 25]$

N will be maximum, when $V - 11 = 0$ i.e. $V = 11$.

So, $V = 11$, $N = \frac{3000}{25} = 120$

Number of overs bowled = $\frac{120}{6} = 20$ overs **Answer: (5)**

64. Let the angles be x° , $2x^\circ$, $3x^\circ$ and y° respectively.

Case 1: Let $x^\circ + 2x^\circ = 3x^\circ + y^\circ = 180^\circ \Rightarrow x = 60^\circ$

$3x^\circ = 180^\circ$ Not possible

Case 2: $x + 3x = 2x + y = 180^\circ$

$x = 45^\circ$, $2x = 90^\circ$

Not possible because if one angle of the cyclic quadrilateral is 90° , diagonal will be the diameter (as angle in semicircle is right angle). Hence, it is not valid since diagonal < diameter.

Case 3: $x^\circ + y^\circ = 2x^\circ + 3x^\circ = 180^\circ$.

$x = 36^\circ$, $2x = 72^\circ$, $3x = 108^\circ$, $y = 144^\circ$.

This satisfies all the conditions. So the smallest angle = 36° . **Answer: (1)**

65. N has 18 factors. So, possible cases (2×9 , 3×6 , $2 \times 3 \times 3$, 18×1)

$N = a^{17}$ or $a^1 \times b^8$, or $a^2 \times b^5$ or $a^1 \times b^2 \times c^2$

$N^2 = a^{34}$ or $a^2 \times b^{16}$ or $a^3 b^{10}$ or $a^2 b^3 c^3$

Possible number of divisors for N^2

$= (34 + 1)$ or $(2 + 1)(16 + 1)$ or $(3 + 1)(10 + 1)$ or $(2 + 1)(3 + 1)(3 + 1)$

$= 35$ or 3×17 or 4×11 or $3 \times 4 \times 4 = 35$ or 51 or 44 or 48 **Answer: (4)**

66. $\frac{1}{2} + \frac{1}{100} < 1 \Rightarrow \left[\frac{1}{2} + \frac{1}{100} \right] = 0$

$\frac{1}{2} + \frac{49}{100} < 1 \Rightarrow \left[\frac{1}{2} + \frac{49}{100} \right] = 0$

$\frac{1}{2} + \frac{50}{100} = 1 \Rightarrow \left[\frac{1}{2} + \frac{50}{100} \right] = 1$

$\frac{1}{2} + \frac{51}{100} > 1 \Rightarrow \left[\frac{1}{2} + \frac{51}{100} \right] = 1$

‘ ‘ ‘
‘ ‘ ‘

$\frac{1}{2} + \frac{75}{100} > 1 \Rightarrow \left[\frac{1}{2} + \frac{75}{100} \right] = 1$ Required sum = $\underbrace{1+1+\dots+1}_{26 \text{ times}} = 26$ **Answer: (5)**

67. Area of hexagon = $\frac{6 \times \sqrt{3}}{4} a^2$ (a is the side of hexagon)

Area of square = b^2 (b is the side of square)

$$\Rightarrow \frac{6\sqrt{3}}{4} a^2 = b^2 \quad \frac{b}{a} = \left(\frac{\sqrt{27}}{2}\right)^{1/2} = \frac{3^{3/4}}{(2)^{1/2}}$$

Ratio of perimeters = $4b : 6a \Rightarrow \frac{4 \cdot \left(\frac{b}{a}\right)}{6}$

$$= \frac{2}{3} \times \frac{3^{3/4}}{2^{1/2}} = \frac{2^{1/2}}{3^{1/4}} = \frac{4^{1/4}}{3^{1/4}}$$

Answer: (4)

68. $S_{(2N+1)} = (N^2 + 1) + (N^2 + 2) + \dots + [N^2 + (2N + 1)]$

$$= (2N + 1) N^2 + \frac{(2N + 1)(2N + 2)}{2}$$

$$= (2N + 1)(N^2 + N + 1) = 2N^3 + 3N^2 + 3N + 1$$

$$= N^3 + (N + 1)^3 \quad \text{Answer: (5)}$$

69. It is only given that a and b are real numbers, but whether they are rational or irrational is not mentioned.

If a, b are rational, $2 - \sqrt{3}$ will be the second root.

So, the data is insufficient. **Answer: (5)**

70. Area of the triangle = $\frac{1}{2} xy$

It will be maximum, when $x = y$

So $5x - 2y \leq 30$

$\Rightarrow 5x - 2x = 30$ (take $x = y$)

$\Rightarrow 3x = 30 \Rightarrow x = 10$

So, the maximum possible area = $\frac{1}{2} \times 10 \times 10 = 50$ sq. units **Answer: (1)**

71. a, b, c are consecutive natural numbers.

$b! = b \times a!$, $c! = c \times b!$ (1)

Also $x = c!$, $y = b!$, $z = a!$ (2)

So, from (1) and (2) $x = c.y$

Hence, II is correct. **Answer: (3)**

72. $a = 4, d = 8, t_n = 576$

$$t_n = a + (n - 1)d \Rightarrow 576 = 4 + (n - 1)8$$

$$(n - 1)8 = 576 - 4 = 572$$

$$n = \frac{572}{8} + 1 = 71 + 1 = 72.$$

$$\text{Middle term} = \left(\frac{72+1}{2}\right)^{\text{th}} \text{ term} = 36^{\text{th}} \text{ term}$$

Half of $n = 36$ terms

$$36^{\text{th}} \text{ term} + 36^{\text{th}} \text{ term} = 252 + 252 = 504 \neq 572$$

$$\text{But } 36^{\text{th}} \text{ term} + 35^{\text{th}} \text{ term} = 252 + 268 = 520$$

Hence, S' Contain at the most 36 terms.

Answer: (3)

73. According to factor theorem:

$(x - 2)$ is factor of $P(x)$ iff $P(2) = 0$

$$8k + 8k^2 + k^3 = 0$$

$$k^3 + 8k^2 + 8k = 0$$

Sum of all values of $k =$ sum of roots of cubical equation

$$= \frac{-\text{coeff. of } k^2}{\text{coeff. of } k^3} = \frac{-8}{1} = -8$$

Answer: (1)

74. Let $a_1 = a - d, a_2 = a, a_3 = a + d$

$$\text{Then } a(a + d) = (a - d)^2$$

$$\Rightarrow d^2 = 3ad$$

$$\Rightarrow d = 3a \text{ or } d = 0$$

Hence, the terms are

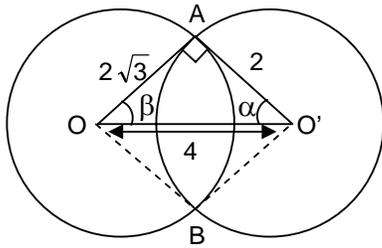
a, a, a or $-2a, a, 4a$

$$\text{Common ratio} = \frac{a_1}{a_2} = \frac{-2a}{a} = -2$$

$$\text{Or } \frac{a_1}{a_2} = \frac{a}{a} = 1$$

Answer: (4)

Solutions 75 – 76:



As in $\triangle OAO'$

$$(OO')^2 = (OA)^2 + (AO')^2$$

$$\text{So, } \angle OAO' = 90^\circ, \tan \alpha = \frac{2\sqrt{3}}{2} = \sqrt{3} = \tan 60^\circ$$

$$\alpha = 60^\circ \quad \text{So, } \beta = 30^\circ$$

$$\begin{aligned} \text{Distance covered by Ravi} &= \left(\frac{120}{360}\right)^\circ (2\pi) \times 2 \text{ or } \left(\frac{240}{360}\right)^\circ \times 2\pi \times 2 \\ &= \frac{4}{3}\pi \end{aligned}$$

Distance covered by Kavi

$$\begin{aligned} &\left(\frac{60^\circ}{360^\circ}\right) \times 2\pi (2\sqrt{3}) \quad \text{OR} \quad \left(\frac{300^\circ}{360^\circ}\right) 2\pi (2\sqrt{3}) \\ &= \frac{2\pi}{\sqrt{3}} \quad \text{OR} \quad \frac{10\pi}{\sqrt{3}} \end{aligned}$$

75. Ratio of their speeds = $2 : \sqrt{3}$ OR $4 : 5\sqrt{3}$

Answer: (4)

76. The time taken = $\frac{\left(\frac{300}{360}\right)^\circ \times 2\pi \times 2\sqrt{3}}{V}$

But, $V = \frac{5\sqrt{3}}{4} \times 30$

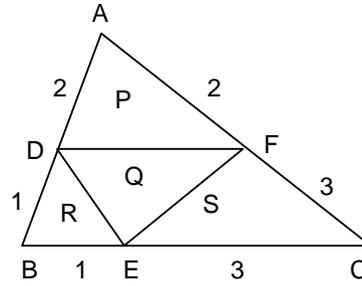
$$\text{Time} = \left(\frac{300}{360}\right)^\circ \times \frac{2\pi \times 2\sqrt{3}}{\frac{5\sqrt{3}}{4} \times 30} = \frac{2\pi}{15} \text{ hrs.} \quad \text{Answer: (1)}$$

77. If total area of ΔABC is M , then

$$P = \frac{4M}{15}, Q = \frac{M}{5}$$

$$R = \frac{M}{12}, S = \frac{9M}{20}$$

$$\begin{aligned} \text{The number of questions} &= \frac{5}{4} (\text{Area of } \Delta ABC) \\ &= \frac{5}{4} M \end{aligned}$$



Hence, the percentage of Algebra in quant section = $\frac{\frac{5}{4}M}{\frac{5}{4}M} \times 100 = \frac{4}{25} \times 100 = 16\%$. **Answer: (5)**

78. AGEF is a cyclic quadrilateral, since $\angle G + \angle F = 90^\circ + 90^\circ = 180^\circ$.

$$\Rightarrow \angle GEF = \angle DAC = 60^\circ \text{ and } GE = FE = 3 \text{ cm}$$

\Rightarrow AE is bisector of $\angle GEF$.

$$\Rightarrow \angle AEF = 30^\circ \quad \text{Answer: (4)}$$

79. $(x + a)(x - 6) + 1 = 0$

$$\Rightarrow (x + a)(x - 6) = -1$$

$$\Rightarrow x + a = -1 \text{ and } x - 6 = 1 \quad \text{or} \quad x + a = 1 \text{ or } x - 6 = -1$$

$$\Rightarrow x = 7 \quad \text{or} \quad x = 5$$

$$\Rightarrow a = -8 \quad \text{or} \quad a = -4 \quad \text{Answer: (4)}$$

80. From the figure $6a + 6b = 72 \text{ cm}$

$$a + b = 12 \quad \dots\dots(1)$$

$$\text{Perimeter of rectangle} = 2(a + b) = 24 \text{ cm}$$

From figure

$$AB = PR \Rightarrow 2a + b = 3b + a$$

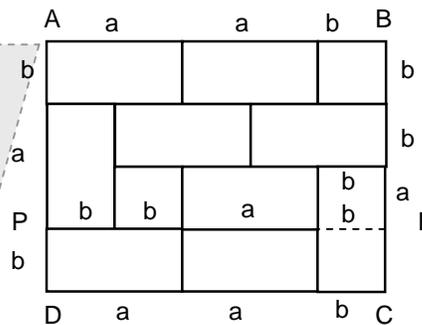
$$\Rightarrow a = 2b \quad \dots\dots(2)$$

Solving (1) and (2)

$$3b = 12 \quad b = 4 \text{ and } a = 8$$

$$\text{Area of the smaller square} = 4 \times 8 = 32 \text{ cm}^2$$

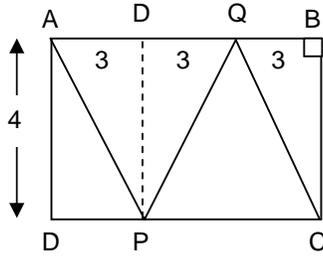
Answer: (2)



81. Number of ways = $7 \times 7 \times 7 \times 7 \times 7 = 7^5$ ways.

Answer: (1)

82.



$$\triangle ADP = \triangle PDA = \triangle PDQ = \triangle CBQ$$

$$\therefore AD = DQ = BQ = \frac{9}{3} = 3$$

$$\text{So } AP = \sqrt{4^2 + 3^2} = 5.$$

$$\text{Distance covered} = 5 \times 3 = 15 \text{ units} \quad \text{Answer: (4)}$$

83. $p + q = -p$, $pq = q$ if $q = 0$ then $p = 0$.

If $q \neq 0$ then $p = 1$ and $q = -2$. Thus, $p = 1$ or 0 . **Answer: (2)**

84. Angle = $30^\circ - \frac{1}{2} \times 20 = 20^\circ$

Answer: (2)

85. $20 \text{ (S.P.)} = 21 \text{ (C.P.)} \Rightarrow \frac{\text{S.P.}}{\text{C.P.}} = \frac{21}{20} = 1.05$

So, profit = 5% **Answer: (3)**

86. Adding all the equations, we get

$$2(x + p) + 2r = 30.$$

$$x + p = 7$$

$$\text{Also } x + p + k = 30 \Rightarrow k = 23 \quad \text{Answer: (3)}$$

Solutions 87 – 88:

Initial ratio = $3 : 5 : 7 = 9 : 15 : 21$

Final ratio = $7 : 5 : 3 = 49 : 35 : 21$

$$\text{Fraction of A mixed in the solution} = \frac{49 - 9}{9} = \frac{40}{9}$$

$$\text{Fraction of B mixed in the solution} = \frac{35 - 15}{15} = \frac{20}{15} = \frac{4}{3}$$

87. **Answer: (1)**

88. **Answer: (5)**

89. $CM = 3AM$ (1)

In $\triangle ABM$ and $\triangle MCP$

$\angle M = \angle M = 90^\circ$

$\angle ABM = \angle MCP$

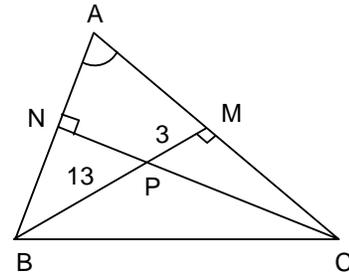
$\Rightarrow \triangle ABM \sim \triangle MCP$

$\frac{AM}{PM} = \frac{BM}{CM}$

$\Rightarrow \frac{AM}{3} = \frac{16}{3AM}$

$AM^2 = 16 \Rightarrow AM = 4$

Answer: (5)



90. $N = a^x \cdot b^y \cdot c^z$

Number of factors = $(x + 1)(y + 1)(z + 1) = 24 = 8 \times 3 \times 1$

$x = 7, y = 2, z = 0$

$N = a^7 \cdot b^2$

The least number = $(2)^7 (3)^2 = 128 \times 9 = 1152$ **Answer: (1)**

