This is the actual copy of CAT – 2000.
This is fourth in the series of selected actual copy CAT papers over the last 10-year period. These CAT papers are expected to give you a taste of the real thing and is an important part of the preparation process.

FLT – 8
Answers & Explanations

1	b	21	d	41	b	61	b	81	a	101	a	121	a	141	a	161	b
2	a	22	d	42	d	62	b	82	c	102	d	122	c	142	b	162	d
3	c	23	b	43	a	63	a	83	d	103	b	123	b	143	b	163	c
4	d	24	a	44	c	64	d	84	b	104	a	124	c	144	c	164	a
5	a	25	c	45	c	65	d	85	b	105	b	125	b	145	d	165	d
6	c	26	b	46	b	66	a	86	c	106	a	126	b	146	a		
7	d	27	c	47	d	67	c	87	c	107	b	127	a	147	d		
8	b	28	d	48	a	68	c	88	b	108	c	128	c	148	d		
9	c	29	a	49	c	69	d	89	c	109	d	129	d	149	c		
10	b	30	d	50	d	70	a	90	b	110	d	130	d	150	a		
11	d	31	a	51	a	71	b	91	d	111	c	131	c	151	d		
12	b	32	b	52	c	72	c	92	c	112	b	132	a	152	b		
13	a	33	c	53	a	73	a	93	c	113	d	133	c	153	d		
14	c	34	a	54	b	74	d	94	d	114	c	134	c	154	c		
15	a	35	d	55	d	75	d	95	b	115	b	135	a	155	d		
16	d	36	c	56	c	76	a	96	a	116	a	136	c	156	a		
17	b	37	a	57	b	77	d	97	c	117	d	137	d	157	b		
18	c	38	b	58	d	78	a	98	d	118	b	138	b	158	a		
19	a	39	d	59	c	79	b	99	b	119	d	139	d	159	b		
20	c	40	b	60	c	80	a	100	b	120	c	140	d	160	c		

	Question number	Total questions	Total attempted	Total correct	Total wrong	Net Score	Time Taken
EU + RC	1 to 55	55					
QA	56 to 110	55					
CR + DI + DS + AR	111 to 165	55					
Total		165					

Analysis of FLT – 8

Overview:

FLT – 8 is an actual replica of **CAT 2000.** This paper epitomizes the importance of question selection. It is a mixture of easy & tough questions. You should meticulously select questions before starting to crack them.

Sect. No.	Topics	No. of Qs	Suggested time	Possible attempts
I	EU & RC	55	50	36
II	QA	55	40	24-25
III	DI& DS	40	40	24-25
	ANALYTICAL REASONING	5		
	CRITICAL REASONING	10		
Total		165	120 min	

Section – I: Reading Comprehension and English Usage

Reading Comprehension:

Topic of Passage	No. of words	No of Qs.	Remarks
Passage 1 – IPR in Biotechnology	1229	8	Very difficult, mostly inferential questions.
Passage 2 – Abstractionism in art	1202	8	Mostly factual questions of moderate difficulty.
Passage 3 – Magnetic memory chips	1254	8	All easy, factual questions.
Passage 4 – European settlers in Indiana	1262	8	Easy questions. Mostly inferential.
Passage 5 – Classical music transmission	1048	8	Mostly factual questions.
Total		**40**	

English Usage:

Type	No of Qs.	Remarks
Para Jumbles – 6 Sentence	5	Easy to moderate difficult level.
Sentence Completion	5	Confusing choices. One needs wide reading experience to judge answers.
Para Jumbles – 5 Sentence	5	Questions 52 and 53 are difficult. Others are very easy.
Total	15	

Section – II: Quantitative Aptitude

This Quant section contains numerous traps. You have to avoid them & attempt relatively easier questions to maximize your score.

The attempts should be two level procedures, Round 1 & Round 2. After attempting all Round1 questions; one should opt for round 2 or Level 2 questions.

Round 1: 56-58, 60-62, 65-70, 73-74, 82-84, 87-88, 94,101, 108, 109 **(23Qs)**

Round 2: 59, 64, 75-76, 95, 99 **(6Qs)**

The following could have been done by **options** or plugging values:
57, 58, 75-76, 109, 110 **(6Qs)**

The questions that should surely have been **left** unattempted as these questions would take more time and there are plenty of questions taking less time than these.
63, 72, 77-81, 85-86, 89-93, 98, 102-105 **(19Qs)**

Topic	No. of Qs.	Topic	No. of Qs.
Arithmetic	**13**	**Algebra**	**20**
Number System	10	Quadratic Equations, Linear Equations & Inequalities.	2
Percentages, SI, CI, Avg. and PLD	2	Progressions	2
Ratio & Proportion, Mixtures	0	Functions	16
TSD/Time and Work	1	Maxima /Minima	0
Geometry	**9**	**P&C, Probability, Sets**	2
Plane geometry	7	**Reasoning Based**	11
Coordinate + graphs + trigo. Mensuration	2	**Miscellaneous**	0
		Total	**55**

Section – III: DI, DS, Logical & Critical Reasoning

Data Type	No of Qs. (No. Of sets)
Data Interpretation	**30 (6 sets)**
Tables	14 (3 sets)
Line Graphs	6 (1 set)
Bar Graphs	10 (2 sets)
Data Sufficiency	10
Analytical Reasoning	5
Critical Reasoning	10
Total	**55**

Following could be the order of selection of the sets in the **two rounds** strategy (for DI & DS only).

R1: DS 131-140, Set 2 (141-145), set 5 (154-159) **(21 Qs)**

R2: Set 1 (126-128), Set 6 (160-165)   (**9 Qs**)

Questions that must be left, as they are speed-breakers:
Set1 (129-130), Set3 (147-149) **(5Qs)**

Overall Analysis:

Sect. No.	Topics	No. of Qs	Suggested time	Possible attempts	Cut-offs
I	EU & RC	55	50	36	25
II	QA	55	40	24-25	18-20
III	DI& DS	40	40	24-25	18-20
	ANALYTICAL REASONING	5			
	CRITICAL REASONING	10			
Total		165	120 min		

This is the actual paper of **CAT-2000**. The above mentioned table depicts the actual cut-off score for at least one IIM.

Explanations

1.   (b) has not been explicitly stated in the passage.

2.   (a) is given in the opening lines of the fifth paragraph. (b), (c) and (d) are imprecise interpretations.

3.   (a) is doubtful. (b) and (d) are general observations. (c) is stated in the opening sentences of the fourth paragraph.

4.   Refer to the end of paragraph 2, where both the problem and the concern have been addressed. (a), (b) and (c) sound far-fetched in this regard.

5.   (b), (c) and (d) are clearly given in paragraph 2. 'reduced biodiversity' suggests that (a) is the answer.

6.   The essence of paragraph 1 is captured in (c). Thus, (a), (b) and (d) are irrelevant.

7.   (a), (b) and (c) are outlined in paragraph 3. Hence, (d) is the answer.

8.   Refer to the concluding sentence of paragraph 3 and the opening sentence of paragraph 4 to mark (b) with confidence. (a) and (c) are not the main concerns. (d) is an obtuse observation with regard to our question.

9.   (a), (b) and (d) find explicit mention in the first paragraph, (c) lacks support in the passage.

10.   The opening lines of the final paragraph are represented suitably in (b). (a), (c) and (d) are doubtful choices.

11.   (a), (b) and (c) are stated vividly in the second paragraph, hence (d) is the answer.

12.   The later part of the third paragraph manages to support (b) as the answer. (a), (c) and (d) are not in tune with the theme of the question.

13.   (a) has been described as revolutionary in the third paragraph. (b), (c) and (d) are given in the fourth paragraph as the conservative tendency.

14.   The latter part of the fifth paragraph makes it clear that (c) is the answer. (a), (b) and (d) are not mentioned.

15.   (a) is stated in the opening lines of the fourth paragraph. (b), (c) and (d) are thus peripheral observations.

16.   The seventh paragraph points towards (d) as the answer. Refer to the 'dual trap'. Thus, (a), (b) and (c) are inadequate answers.

17.   Refer to the beginning of paragraph 2, paragraph 3 and paragraph 5 to get (b) as the answer.

18.   Refer to the second sentence of paragraph 4 to mark (c) as the answer.

19.   Refer to the second sentence of paragraph 6 to mark (a) as the answer.

20.   Refer to the second sentence of paragraph 7 to mark (c) as the answer.

21. Refer to the last sentence of paragraph 6 to mark (d) as the answer.

22. Russell Cwburn and Mark Welland are trying to build the magnetic chip that can store and manipulate information. Hence (d) is the answer.

23. Refer to the latter part of paragraph 8 to mark (b) as the answer.

24. Refer to the second sentence of paragraph 1 to mark (a) as the answer. (b) is stated in the opening lines of the passage. The opening lines of the sixth paragraph confirm (c). The concluding lines of the fourth paragraph confirm (d).

25. (a) is not the answer because the failure of both innovations need not be illustrated. (b) is obviously wrong as there is little community perspective involved in the two instances. (d) is not the focus of the passage, how 'deserts have arisen'. (c) is the best answer as the last paragraph clearly portrays an equally bleak outcome.

26. (b) can be easily inferred from the latter half of the passage. (a) and (c) are clearly not true. (d) does not find support in the passage.

27. (c) is the obvious answer as can be amply inferred from the last paragraph. (a), (b) and (d) are uncertain choices.

28. The introduction of the bereavement counsellor in the ninth paragraph points towards (d) as the answer.

29. (b), (c) and (d) can be immediately ruled out. The first paragraph shows that (a) is the answer.

30. Refer to the fourth sentence in the sixth paragraph and the concluding sentence of the passage to get (a), (b) and (c) as valid choices.

31. (b) may be right. (c) and (d) are unlikely answers. (a) is stated in the concluding sentence of the ninth paragraph.

32. (a), (c) and (d) are stated overtly in the passage. (b) is not true as the second innovation did not lead to the migration of the community.

33. (c) is the best answer as can be derived from the concluding lines of paragraph 7.

34. The answer is (a) as is explicitly given in paragraph 1.

35. Refer to the second paragraph 'preserves from oblivion, the vanishing, elusive moment of oral transmission'. The best answer is thus (d).

36. The second sentence of the fifth paragraph makes it clear that (c) is the best answer.

37. The opening lines of the last paragraph make it clear that (a) is the answer.

38. (a), (c) and (d) can be inferred from paragraphs 7 and 8. But it is not mentioned that the conductor can modify the music, hence (b) is the answer.

39. Information given in paragraph 6 makes it clear that (d) is the answer.

40. (d) is an observation, not the overall idea. (a) and (c) are also observations. (b) best captures the central idea of the passage as is evident from the latter half of the passage.

41. B has to follow 1 as it exemplifies the principle mentioned in 1. A continues the explanation of what happens when light bounces off 2 surfaces. D explains further and C6 gives the result.

42. B follows 1 as low light conditions are same as darkened conditions. DCA discuss the experiment and 6 the happy result.

43. D follows 1 as 'this' in D is in reference to nation state concept in 1. B follows D by explaining why that concept is being criticized. A continues with 'then' and C too with 'even worse'.

44. C follows 1 as a logical continuation, the questionable — suspicion link A logically follows C by comparing position in humanities. B and D give reasons for distortions in humanities.

45. A gives the reason why communists despised horses in 1. What they preferred instead is given in B. C makes allowances and D6 presents the alternate view.

46. Future is what the company also needs to keep in mind when selling popular contemporary art. (a) and (c) are wrong because we need not keep an eye on the present, it's already here. Remember that we have the word 'though' in the sentence and hence, the words must contrast 'future-popular (now)'.

47. 'Touts' are illegal middlemen, who neither care for the poor nor the trees. 'touts' are persons who solicit business brazenly (rip-roaring business). 'poor' is the only word that can fill the second blank (it is their tree).

48. 'Decision' comes long after 'reconciliation'. 'Reconcile' goes with conflicting also. 'reconcile' is the only word that can fill the first blank (conflicting images). 'decide what to make' is standard English usage.

49. 'Depressing times of spiraling prices' and 'soaring crime rates' fits in best. (b) is out, because 'booming' and 'crime rates' don't go well together. 'spiralling' prices are prices that rise out of order. Crime rates cannot 'debilitate', and 'soaring' matches the depressing tone of 'spiralling'.

50. 'Manners and morals' is common usage, theme is better than story in terms of literature. 'style' cannot fit the first blank, because 'manners' is already mentioned. 'wealth' cannot fill the first blank, because 'riche' is already stated.

51. EC is the mandatory pair, as 'those' in C refers to male children in E. B opens the paragraph as it introduces 'Bellicose spartans'. 'military training' in C is described in D and A.

52. B opens the paragraph by introducing the motion of 'human being drawing images in cave'. C introduces the new means of image making, i.e. photography. The inventory in D refers to the images in C. 'everything has been photographed' in D should be followed by 'insatiability' in A. 'confinement' in A is then followed by 'enlarge our notions' in E.

53. AE is a mandatory pair because 'breadth of information' mentioned in E is in reference to 'basic information' in A. 'extending over' in E should be followed by 'confined' in C as a contrast. B follows with 'nor' — the same concept. D gives the 'contrary' view in B.

54. C introduces the paragraph with the concept of social cost of theft. 'Both parties' in A refer to 'thief and victim' in C. B describes simple property rights. DE describes escalating costs and methods.

55. DB is a mandatory pair as B is an example of what is being stated in D. A — 'likelihood of an accident' follows B — 'accident'. C follows A as the strategic problem unfolds.

56. $99 \times D = a_1 a_2$. Hence, $D = \dfrac{a_1 a_2}{99}$. So D must be multiplied by 198 as 198 is a multiple of 99.

57. The data is not linear. So check (b). Let the equation be $y = a + bx + cx^2$.
Putting the values of x and y, we get the following result.
$\Rightarrow 4 = a + b + c$, $8 = a + 2b + 4c$ and $14 = a + 3b + 9c$.
Solving these, we get $a = 2$, $b = 1$ and $c = 1$. So the equation is $y = 2 + x + x^2$.

58. $a_1 = 1$, $a_2 = 7$, $a_3 = 19$, $a_4 = 43$. The difference between successive terms is in series 6, 12, 24, 48, ..., i.e. they are in GP. Hence,
$$a_{100} = a_1 + a\left(\frac{r^n - 1}{r - 1}\right) = 1 + 6\frac{\left(2^{99} - 1\right)}{(2 - 1)} = 6 \times 2^{99} - 5$$

59. $\dfrac{1}{1.3} + \dfrac{1}{3.5} + \dfrac{1}{5.7} + ... + \dfrac{1}{19.21}$
$= \dfrac{1}{2}\left(1 - \dfrac{1}{3}\right) + \dfrac{1}{2}\left(\dfrac{1}{3} - \dfrac{1}{5}\right) + \dfrac{1}{2}\left(\dfrac{1}{5} - \dfrac{1}{7}\right) + ... \dfrac{1}{2}\left(\dfrac{1}{19} - \dfrac{1}{21}\right)$
$= \dfrac{1}{2} - \dfrac{1}{42} = \dfrac{(21 - 1)}{42} = \dfrac{20}{42} = \dfrac{10}{21}$

60. The vehicle travels 19.5 km/L at the rate of 50 km/hr.
So it should travel $\dfrac{19.5}{1.3}$ km/L at the rate of 70 km/hr
= 15 km/L. The distance covered at 70 km/hr with 10 L
= 10 × 15 = 150 km

61. Use any 7 consecutive numbers to check the answers.
$n = \dfrac{(1 + 2 + 3 + 4 + 5)}{5} = 3$, average of 7 integers is
$k = \dfrac{(1 + 2 + 3 + 4 + 5 + 6 + 7)}{7} = 4$.
So k = n + 1.
Alternately, the average of the first 5 terms is the middle term which is third term, and the average of the first 7 terms is the middle term which is the fourth term. Hence, it is one more than the previous average.

62. Use choices. The answer is (b), because $-x < -2$ and $-2 < 2y \Rightarrow -x < 2y$.

63. The possibilities are W@W@W@ (or) @W@W@W, where 2 blue and 1 red flag occupy the space marked as @. Hence, the total permutation is 2(3!/2!) = 6.

64. Numbers which are divisible by 3 (between 100 and 200) are 33. Numbers which are divisible by 21, i.e. LCM of 7 and 3 (between 100 and 200) are 5. Out of the 33 numbers divisible by 3, 17 are even and 16 are odd. Out of the 5 numbers divisible by 7, three are odd. Hence, the number of odd numbers divisible by 3 but not by 7 is (16 − 3) = 13.

65. Take any three odd and positive numbers and check this out.

66. There is only one 5 and one 2 in the set of prime numbers. Hence, there would be only one zero at the end of the resultant product.

67. If the sides of the triangle are a, b and c, then a + b > c. Given a + b + c = 14.
Then the sides can be (4, 4, 6), (5, 5, 4), (6, 5, 3) and (6, 6, 2). Hence, four triangles are possible.

68. N = 1421 × 1423 × 1425. When divided by 12, it shall look like $\dfrac{\left[(1416 + 5) \times (1416 + 7) \times (1416 + 9)\right]}{12}$.
Now the remainder will be governed by the term 5 × 7 × 9, which when divided by 12 leaves the remainder 3.

69. Let r be the remainder. Then 34041 – r and 32506 – r are perfectly divisible by n. Hence, their difference should also be divisible by the same.
(34041 – r) – (32506 – r) = 1535, which is divisible by only 307.

70. Each term has to be either 1 or –1.
Hence, if the sum of n such terms is 0, then n is even.

71. Total 400 million is for 64.75% of the population. Hence, total population is 617.76 million. Let females be F and males be M. Then $\dfrac{F}{M} = 0.96$ (in the class below 15).
Total population in the range is approximately 185.32 million. Hence, number of females is 90.8 million.

72. There are two possible cases. The number 9 comes at the end, or it comes at position 4, 5, or 6. For the first case, the number would look like:

$635...\dfrac{9}{674}...9$. In both these cases, the blanks can be occupied by any of the available 9 digits (0, 1, 2, ..., 8). Thus, total possible numbers would be $2 \times (9 \times 9 \times 9) = 1458$. For the second case, the number 9 can occupy any of the given position 4, 5, or 6, and there shall be an odd number at position 7. Thus, the total number of ways shall be $2[3(9 \times 9 \times 4)] = 1944$. Hence, answer is 3402.

73. Assume some values of A and B and substitute in the options to get the answer.

74. Use choices. Put some values and check the consistency.

75. Use choices. (a), (b) and (c) could be both negative as well as positive, depending on the values of x and y.

76. For (a), x, y < – 1. Then value of f(x, y) = $(x + y)^2$ and value of g(x, y) = $-(x + y)$. Substituting any value of x, y < – 1, we get f(x, y) always greater than g(x, y).

77. Use choices. For the given set of questions, function j(x, y, z), n(x, y, z) means minimum of x, y, z and h(x, y, z), m(x, y, z) means maximum of x, y, z. f(x, y, z), g(x, y, z) means the middle value.

78. Use choices.

79. The answer is (b) because the denominator becomes zero.

80. The robot begins to give material to machine A and then to D, it thus covers 40 m in that time span and takes 4 s. Also then it returns to the origin, and takes 4 s, while covering 40 m again. When it arrives at the origin, the messages of B and C are already there, thus it moves to give the material to them, which takes it in total 6 s, and it covers 30 + 30 = 60 m in total. Hence, the distance travelled by the robot will be 40 m + 40 m + 60 m = 140 m.

81. In this question, once the robot has delivered the material to machines A and D, it shall reach the origin 2 (nearest), taking 6 s, and covering 60 m. Then it immediately moves to deliver material to machines C and B covering a distance of 40 m and finally back to the origin (nearest). Thus, it cover a distance of 60 m. Hence, it covers a total distance of 120 m.

For questions 82 to 84:
In graphs, the horizontal line x represents the values of x and the vertical line represents y, where y = f(x). For different values of x, we get the corresponding values of f(x).

82. From the graph, x = 2
$\Rightarrow f(2) = 1$ and $x = -2 \Rightarrow f(-2) = 1$
Thus, $f(2) = f(-2)$. Hence, $f(x) = f(-x)$

83. From the graph, $x = 1 \Rightarrow f(1) = 2$ and $x = -1$
$\Rightarrow f(-1) = 1$
Thus, $f(1) = 2f(-1)$
Hence, $3f(x) = 6f(-x)$

84. From the graph, x = 4
$\Rightarrow f(4) = -2$ and $x = -4 \Rightarrow f(-4) = 2$
Thus, $f(4) = -f(-4)$
Hence, $f(x) = -f(-x)$

85. At the end of first operation, A = 3, B = 0, C = 2. At the end of the second operation, the possible set can be, all the liquid of C is emptied into B or drained off, such that now once again the liquid of A can be transferred to C. Thus, A should have in all one litre. Best method is to use choices.

86. At the end of the above stated three steps, and three more steps, if A has in all 4 L, then the only possible thing is that B and C have emptied all their contents into A. Thus, C shall have 0 litre.

87.
$$f(2) = \frac{1}{3}, \quad f^2(2) = \frac{3}{4}, \ f^3(2) = \frac{4}{7}, \ f^4(2) = \frac{7}{11}, \ f^5(2) = \frac{11}{18}$$

Answer is $\dfrac{1}{18}$.

88. f(–1) = 0, f(0) = 1, f(–2) = –1

89. There shall be 8 teams in each group. Each team in a group shall be playing with every other team. Hence, total number of matches shall be $\dfrac{(7 \times 8)}{2} = 28$ in one group. Hence, in both the groups, there shall be 56 matches. This is for the first stage. Thereafter, there are 8 teams in knockout rounds from which one winner emerges, or 7 losers are identified. Hence, 7 more matches, i.e. in all 63 matches.

90. Under extreme conditions, the following can be the maximum number of matches won.

Teams	A	B	C	D	E	F	G	H
A			√	√	√	√	×	×
B	×			√	√	√	√	×
C	×	×			√	√	√	√
D	×	×	×					
E	×	×	×					
F	×	×	×					
G	√	×	×	√	√	√		√
H	√	√	×	√	√	√	×	

In the above table,
√ represents win,
× represents loss and

I = A × A. (Since single team cannot play with itself.) From the table, A, B, C, G and H can win five matches each. Hence, we cannot decide that which team will qualify for the second round. Therefore, the minimum number of wins that can assure a place in the second stage is 6.

91. **Note:** The option given in the answer key of 'CAT 2001 Bulletin' is incorrect.

92. There are 8 teams. Hence, there would be 7 matches in 3 rounds.

94. N can be written either $(54 + 1)^3 + (18 - 1)^3 - 72^3$ or $(51 + 4)^3 + 17^3 - (68 + 4)^3$. The first form is divisible by 3, and the second by 17.

95. $x^2 + y^2 = 0.1$
$|x - y|^2 = x^2 + y^2 - 2xy$
$(0.2)^2 = 0.1 - 2xy$
or $2xy = 0.06$ or $xy = 0.03$

Now $|x| + |y| = \sqrt{x^2 + y^2 + 2xy} = \sqrt{0.1 + 0.06}$
$|x| + |y| = 0.40$
Hence, $x = 0.3, y = 0.1$ or vice versa.

96. The gradient of the line AD is –1. Coordinates of B are (– 1, 0).
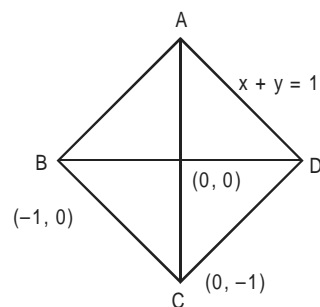
Equation of line BC is $x + y = -1$.

97. Let the area of sector S_1 be x units. Then the area of the corresponding sectors shall be 2x, 4x, 8x, 16x, 32x and 64x. Since every successive sector has an angle that is twice the previous one, the total area then shall be 127x units. This is $\frac{1}{8}$ of the total area of the circle.
Hence, the total area of the circle will be 127x × 8
= 1016x units. Hence, angle of sector S_1 is $\frac{\pi}{1016}$.

98. Shift 1, 2, 3 to the second table. Bring back 2, 3 to the first table. Take 3 only to the second table and finally shift 2 to the second table.

99. Solving these equations, we get 6 distinct lines.
$x + y = 1, x + y = -1, x = 1, x = -1, y = 1$ and $y = -1$. Tracing these curves, we get the area common as 3 square units.

100. Use the choices. If b = 1, then the factors are $(x - a)(x^2 + 1)$. This cannot yield 3 real roots.

101. We know that $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac = 3ab + 3bc + 3ac$
Now assume values of a, b, c and substitute in this equation to check the options.

Short cut: $(a - b)^2 + (b - c)^2 + (c - a)^2 = 0$.
Hence, a = b = c.

102.
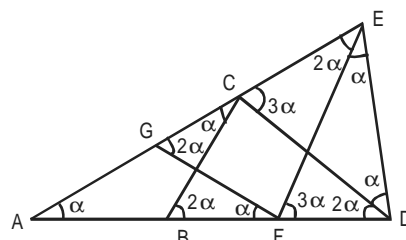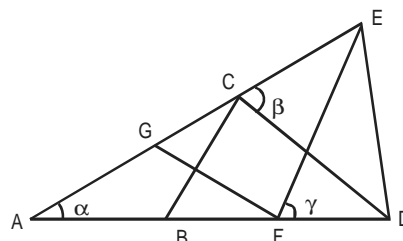
Let $\angle EAD = \alpha$. Then $\angle AFG = \alpha$ and also $\angle ACB = \alpha$. Therefore, $\angle CBD = 2\alpha$ (exterior angle to $\triangle ABC$). Also $\angle CDB = 2\alpha$ (since CB = CD).
Further, $\angle FGC = 2\alpha$ (exterior angle to $\triangle AFG$). Since GF = EF, $\angle FEG = 2\alpha$. Now $\angle DCE = \angle DEC = \beta$ (say). Then $\angle DEF = \beta - 2\alpha$.
Note that $\angle DCB = 180 - (\alpha + \beta)$. Therefore, in $\triangle DCB$, $180 - (\alpha + \beta) + 2\alpha + 2\alpha = 180$ or $\beta = 3\alpha$. Further $\angle EFD = \angle EDF = \gamma$ (say). Then $\angle EDC = \gamma - 2\alpha$. If CD and EF meet at P, then $\angle FPD = 180 - 5\alpha$ (because $\beta = 3\alpha$).
Now in $\triangle PFD$, $180 - 5\alpha + \gamma + 2\alpha = 180$ or $\gamma = 3\alpha$. Therefore, in $\triangle EFD$, $\alpha + 2\gamma = 180$ or $\alpha + 6\alpha = 180$ or $\alpha = 26$ or approximately 25.

103. 60 is wrong because then to arrive at a total of 121, the other box will have to weigh 61 kg which will be obviously not the highest. 64 is wrong too, because then to add up to 121, the other weight will have to be 57 and to make up to a total of 120, the next box shall have a weight 63 which obviously makes the maximum possible total as 64 + 63 = 127. 62 is the correct answer because the other boxes shall be 59, 54, 58, 56. These will give all the totals given above.

104. Let the number of direct roads from A to B, B to C, and C to A be x, y and z respectively. Then x + yz = 33, y + xz = 23. Hence, by solving, we get z = 6.

105. g(1) = f[f(1)] + 1 = 2 . Since f(1) has to be 1, else all the integers will not be covered. f(n) is the set of odd numbers and g(n) is the set of even numbers.

106.
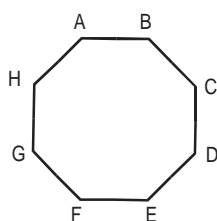
In order to reach E from A, it can walk clockwise as well as anticlockwise. In all cases, it will have to take odd number of jumps from one vertex to another. But the sum will be even. In simple case, if n = 4, then a_n = 2. For a_{2n-1} = 7 (odd), we cannot reach the point E.

107. f(1, 2) = f(0, f(1, 1));
Now f(1, 1) = f[0, f(1, 0)] = f[0, f(0, 1)] = f[0, 2] = 3
Hence, f(1, 2) = f(0, 3) = 4

108.

```
12 | 1982
12 | 165 – 2
12 | 13 – 9
   | 1  – 1
```

The answer is 1192.

109. Work with options. If the cylinder has a capacity of 1,200 L, then the conical vessel shall have a capacity of 700 L. Once 200 L have been taken out from the same, the remaining volume in each of them shall be 1000 and 500.

Alternative method:
Let the volume of conical tank be x.
Then the volume of cylindrical tank = x + 500
x + 300 = 2(x – 200) $\Rightarrow$ x = 700
Volume of cylindrical tank = 700 + 500 = 1200.

110. Work with options. Length of wire must be a multiple of 6 and 8. Number of poles should be one more than the multiple.

111. If the number of students enrolled for a certain class do not fit into that age interval, they are in excess and hence, unrepresentative, thus resulting in bloated ratios. (a) is wrong because the definition of gross enrollment ratio itself is flawed. Attendance is not the focus of our argument. We are also not concerned with demographic trends, but only with given data.

112. The argument states that 'clubs that spend more should finish at a higher ranking'. This is reflected in 'highly paid white players returned a low ranking'. (a) focuses on clubs that recruited black players, a consequence Szymanski is not immediately concerned with. (c) also throws no light on the relation 'clubs that spend more should finish higher'. Nor does (d).

113. Only (d) connects the recommendation directly to the cause 'rising tensions' in prisons and not to any marginal political factors. (a), (b) and (c) may have contributed, but peripherally, to the minister's decision.

114. (a) and (d) cover the government's honourable intentions, which look best on paper. (b) discusses one feasiblilty factor. (c) is the best choice as it shows how the project has reached the implementation stage from the pilot stage.

115. 'Manoeuvrability' is linked to 'flight direction changes' in (d). (c) just vaguely mentions 'faster'. (a) makes no inference, as such. It may or may not be true. There is insufficient evidence to infer (d), it sounds rather far-fetched.

116. (b) does not attack the argument, it helps the Association's cause. (c) is pointless, if there isn't adequate consumption. (d) has little to do with the core issue in the argument. But (a) if true, would render the cumulative efforts of the Association fruitless.

117. (a) would only result in more cars per family. (b) and (c) defeat Athens' purpose as citizens devise ingenious methods to maintain status quo both in terms of number of cars and congestion.

118. The Central Bank can only express 'reservations' on 'monetisation' to the government. It cannot be the 'boss', it only advises. (c) does not support the conclusion in any way. (a) and (d) are specific observations, but they do not contribute to our answer.

119. (d) is a summary for the general words 'varied use', 'common basis' pertaining to the 'symbol' in the geographical and historical context. (c) does not present the complete picture. (a) refuses to divulge the significance of the umbrella. (b) is wrong as the ruler is regarded as the instrument of firmament of the supreme law.

120. This answer goes without guessing. There are two parties in the game, and each has its own strategy and a guess on the opponent's move. (a) involves more of cooperation strategies than game plans. (b) is competition involving more than two candidates. (d) is about cartels.

121. Since yellow is between green and red, it should be house number 2 or 3. Also green is adjacent to blue house, it should have blue and yellow house on either side. Hence, the following table can be constructed.

House number	1	2	3	4
Colour	Blue	Green	Yellow	Red
Occupant	X	Z		

Since X does not live adjacent to Z, it has to live in blue house.

122. The ratio of points for carrying books of various subjects is:
Management : Mathematics : Physics : Fiction
= 4 : 3 : 2 : 1

Since the points are to be maximized, the number of books that Ramesh should carry in descending order is management, mathematics, physics and fiction. The ratio which Ramesh has to maintain is:
Management : Fiction < 1 : 2,
Mathematics : Physics < 1 : 2.
This means that a combination of management and fiction books in the ratio of 1 : 2 will give 6 points while a combination of mathematics and physics books in the ratio of 1 : 2 will give 7 points, hence, Ramesh should carry the following combination of books to maximize the points; management 1, mathematics 2, physics 5 and fiction 2, a total of 22 points.

123. The following table can be created using the data given.

Persons	P	M	U	T	X
Colour choice	Blue and Red	Yellow	Red and Blue	Black	
Stays in					Hotel
Does not stay in	Palace		Palace	Palace	

Since X stays in a hotel and P or U or T cannot stay in a palace, M stays in palace.

124. The attendants of X, Y and Z are to be Mohan, Jack and Rita. The animals under Mohan's care is given in the data. Since Jack does not attend to deer, lion and bison, the following table can be created using the data given.

Attendants	Mohan	Jack	Rita
Animals	Lion and Panther	Bear and Panther	
Enclosure	X	Y	Z

Name	Mohan	Jack	Rita	Shalini	Suman
Animals	Lion and panther	Bear and panther	Deer and bison	Lion and bear	Deer and bison
Cage	X	Y	Z	Q	P

The data for Mohan and Jack can be filled directly. Similarly, X, Y, Z can be filled directly from data given. The key after filling in these animals is that Z and P have the same pair of animals, the only option is deer and bison.

125. By trial and error, we can make different combinations and find the cost.
Like 20 kg × 2 + 10 kg × 4, the cost would be Rs.180. The minimum cost comes in the case of 10 kg × 8, i.e. Rs.160.

Direction for students: The table for questions 126 to 130 in CAT 2001 Bulletin has some misprints and it should be read like the following.

Information Technology Industry in India (Figures are in million US dollars)

	1994-95	1995-96	1996-97	1997-98	1998-99
Software					
Domestic	350	490	670	950	1250
Exports	485	734	1083	1750	2650
Hardware					
Domestic	590	1037	1050	1205	1026
Exports	177	35	286	201	4
Peripherals					
Domestic	148	196	181	229	329
Exports	6	6	14	19	18
Training	107	143	185	263	302
Maintenance	142	172	182	221	236
Networking and others	36	73	156	193	237
Total	2041	2886	3807	5031	6052

126. Total exports
= Software export + Hardware export + Peripherals export
Hence, total export as a percentage of IT business for 1994-95

$$= \frac{668}{2041} \times 100 = 32.7\%$$

For 1995-96 $= \frac{775}{2886} \times 100 = 26.8\%$

For 1996-97 $= \frac{1383}{3807} \times 100 = 36\%$

For 1997-98 $= \frac{1970}{5031} \times 100 = 39\%$

For 1998-99 $= \frac{2672}{6052} \times 100 = 44\%$

127. Percentage growth for 1995-96 = 41%,
1996-97 = 32%, 1997-98 = 32%, 1998-99 = 20%.

128. (a) and (b) can be easily eliminated from the given table.

129. Total IT business in hardware (Export + Import) shows a continuous increase from 1994-95 to 1997-98 and then declines in 1998-99.

130. In this question there are two activities — hardware and peripherals, hence for year X to dominate year Y, at least one activity in year X has to be greater than that in year Y and the other activity in year X cannot be in year Y. In (a), (b) and (c) while hardware dominates in one year, the peripherals dominate in the other.

131. Statement I implies $X > Y$, or $X > Z$, or $X > Y$ and Z
Statement II implies $Y > X$, or $Y > Z$, or $Y > X$ and Z.
Combining both statements, we can get $Y > X > Z$ or $X > Y > Z$. Hence, Z is the smallest.

132. The first statement implies that X must lie between 0 and -3. Hence, it gives the answer. But from the second statement, we have either $X > 3$ or $X < 0$. This does not gives us an information about the modulus of X.

133. The Venn diagram arrived at from both I and II clearly indicates that 500 people are watching programme P.
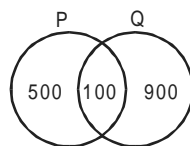
134. For a given inradius and circumradius, there is only one possible value of (PR + RQ).
Hence, both the statements are required to answer the question.

135. Statement I implies that profit is 2.95%, but we want the profit per rupee spent on buying the shares. The cost of buying the shares for Harshad is CP + 0.01 CP = 1.01 CP. The cost of selling is
SP $-$ 0.01 SP = 0.99 SP
The difference of the two is profit, i.e.
0.99 SP $-$ 1.01 CP = 0.99 $\times$ 1.05 CP $-$ 1.01 CP
= 0.0295 CP. Hence, profit = 2.95%.

136. We cannot work the questions individually through I or II. But combining the two statements, we get
$(2 \oplus 0) = (0 \oplus 2) = 0$ and $0 \oplus (-5 \oplus -6) = 0$.

137. Both the statements combined also do not tell us if they are intersecting or not. The two lines can be parallel also depending on the values of a, b, d, e.

138. You can see from the following diagram that both statements individually
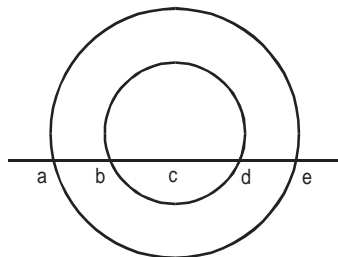
imply towards c being the mid-point of bd. The ratio of ac/ce will be one by using any statement.

139. Here, by combining the two statements, we get the duration of the flight.
For the arrival time we should have information regarding the time zone difference of Mumbai and No-man's-land.

140. Statement I implies $X - Y = 6$.
Statement II implies XY is divisible by 6.
You can see that many values of X and Y can satisfy statement I and II.

141. If the total number of factories is 100, then the total number of employees
= 60 $\times$ 100 = 6000 of which 64.6% = 3876 work in wholly private factories. Since the number of wholly private factories = 90.3, the answer = $\dfrac{3876}{90.3}$ = 43.

Short cut: $0.64 \times \dfrac{60}{0.903} < \left(\dfrac{2}{3}\right) \times 60 = 45$

142. Value added per employee = $\dfrac{\text{Value added}}{\text{Employment}}$

143. Compound productivity = $\dfrac{\text{Gross output}}{\text{Fixed capital}}$.

Hence, compound productivity for various sectors is:
Public sector = 0.6, Central Government = 0.725, States/Local = 0.47, Central/States/Local = 1.07, Joint sector = 1.23 and wholly private = 1.36. Hence, the order should be: Wholly private, Joint, Central/State/Local, Central Government, Public sector and State/Local government.

144. Calculate the ratios: Value added/employment and value added/fixed capital for the sectors mentioned in the choices. The respective values are:
Wholly private 0.9 and 1.25; Joint sector 1.59 and 1.19; Central/State/Local 1.8, 1.28; others 0.92 and 0.75.

145. The number of factories in joint sector is 1.8% = 2700, thus the number of factories in Central Government = 1% of (2700 x 100/1.8) = 1500. Value added by Central Government = 14.1% of 1,40,000 crore = 19,740.

Hence, answer = $\dfrac{19740}{1500}$ = Rs. 13.1 crore.

146. Find the difference between FEI in 1998 relative to its FEI in 1997. Hence, for India it is 0.72 – 1.71 = –0.99. For China it is 4.8 – 5.96 = – 1.16. For Malaysia it is 9.92 – 10.67 = –0.75 and for Thailand it is 5.82 – 5.09 = 0.73. Change in FEI in 1998 relative to its FEI in 1997.

For India, percentage = $\dfrac{-0.99}{1.71}$ × 100 = –57.89

For Malaysia, percentage = $\dfrac{-0.75}{10.67}$ × 100 = –7.02

For Thailand, change is 14.34%.
For China and Korea, changes are – 19.46% and 15.74% respectively.
Hence, we can see that the country with the largest change in FEI is India.

147. Since the absolute values are not given, it cannot be calculated.

148. Assume of GDP of India for 1997 to be x.

For 1998, India's FEI = $\dfrac{0.72 \times 102x}{100} = 0.7344x$

And foreign equity inflows for 1997 = 1.71x
For China, assume GDP as y. Then FEI in 1998

= $\dfrac{107y}{100}$ × 4.8 = 5.136y. And FEI in 1997 = 5.96y.

For South Korea, let GDP be z.

FEI in 1998 = $\dfrac{95z}{100}$ × 2.5 = 2.375z and FEI = 2.16z.

We can see that India and China were lower in 1998 than in 1997, and South Korea is higher in 1998 than in 1997.

149. Let x be the foreign equity inflow of India. Hence, China's foreign equity inflow is 10x.
Now in 1998, FEI in India was 0.72, therefore

0.72 = $\dfrac{x}{\text{GDP of India}}$

Similarly, FEI in China in 1998 was 4.8, therefore 4.8

= $\dfrac{10x}{\text{GDP of China}}$

Hence, (GDP of China/GDP of India)
= (10 × 0.72)/4.8 = 1.5.
Thus, China's GDP is 50% higher than that of India.

150. As from the table, the deficit intensity from 1993-94 to 1997-98 are 5.1, 6.3, 7.6, 8 and 5.
Therefore, highest growth rate is 7.6 – 6.3 = 1.3 which is in 1994-95.

151. The highest growth rate = $\dfrac{7.6-6.3}{6.3} \times 100 = 23.5\%$

152. From the tables given,
Import of raw material = 10.1 × Sales (S) import of capital goods = 17.6 × Gross fixed assets (GFA)
Given imports = Raw materials + Capital goods
So import = 10.1 S + 17.6 GFA
So imports = 14.2 S

Hence, 14.2 S = 10.1 S + 17.6 GFA

Hence, $\dfrac{S}{GFA} = \dfrac{17.6}{4.1} = 4.3$

153. Clear from the table.

154. Clear from the given graph.

155. First find out the growth in 1990 of the all four sectors. So manufacturing 9% of 20 = 1.8. Hence, 20 + 1.8 = 21.8. Similarly, for mining and quarrying it is 15.6. For electrical, it is 10.85 and for chemical it is 16.1, now in 1991 there is 1% negative growth in manufacturing. So 1% of 21.8 becomes 0.218. Thus, 21.8 – 0.218 = 21.582. Similarly, for mining and quarrying it is 15.44. For electrical it is 11.88 and for chemical it is 16.21. Now we add the figures for 1991 of all the sectors which comes to 21.582 + 15.75 + 11.88 + 16.21 = 65.42. Now 65.42 – 64.35 = 1.07 which comes to approximately 1.5% growth rate.

156. Clear from the graph.

157. In 1990, there is 4% growth. Hence, 4% of 15 = 0.6. So weightage in 1990 becomes 15.6.
Similarly, in 1991 it becomes 15.44, in 1992 it is 15.6, in 1993 it is 14.97, in 1994 it is 16.16.
Hence, it can be seen that the lowest level of production was in 1993.

158. Find out the weightage for all the sectors for 1994. For manufacturing it is 25.54, for mining and quarrying it is 16, for electrical it comes out to be 14.5 and for chemical it is 19.5. The total comes to approximately 77. In 1989, it was 60. Hence, 77 – 60 = 17 which is approximately 25% increase.

159. Since the index of total industrial production in 1994 is 50% more than in 1989, it becomes 150.
Now total weightage for manufacturing, mining and quarrying, electrical and chemical in 1994 is approximately 77. So 150 – 77 = 73.
In 1989, it was 100 – 60 = 40.
So 73 – 40 = 33, which is approximately 87.5%.

160. Cost in shift operation = 800 + 1200 = Rs. 2,000
Variable cost for 40 units = Rs. 3,600
Approximate average unit cost for July

= $\dfrac{3600+2000}{40} = Rs.\,140$.

161. The only change for change of production from 40 to 41 is the variable cost which is
Rs. (3730 – 3600) = Rs. 130.

162. The trend for MC is varying and is just the reverse condition as that stated in C. Take some values and check.

163. Total sales revenue = Rs. (150 × 40) = Rs. 6,000
Total production cost = Rs. (3600 + 2000) = Rs. 5600.
So profit = Rs. 400.

164. Profit is highest when there is no second shift.

165. (a) and (b) are definitely not true as the case is the inverse of that mentioned in (c). Take some values and check.