CATalsyt Education Group :

CATaylst is a Unique group tuition program. It was created by Munira Lokhandwala with general idea of selecting a small group of students every year and training them to crack the mother of all entrance tests.

Rahul Vani and Bijoy Shah soon joined the group to give CATalyst a whole new dimension, so that maximum number of students benefit from CATalyst.

Our CAT 2006 Results

Total Students : 28 IIM call getters : 9

More than 33% CATalystians scored 99.xx%tile

Munira Lokhandawala teaches at CATalyst.

Who's Munira Lokhandawala:

- **30 year old woman. Currently resides in Vashi**
- **Mathematics graduate, St. Xavier's, Class of 1997**
- **IIM Calcutta, Class of 1999**
- **Worked as CAT Product Head and Faculty, IMS, CL etc.**
- **Loves solving Maths Puzzles, dancing, bullet points**
- **99.99%ile in CAT 2004, 100%ile in CAT 2005, 99.99%ile in CAT 2006**

Munira answers queries at: http://www.orkut.com/Community.aspx?cmm=35535271

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SECTION I

1. 2 Cities within 10^0 E to 40^0 E are Vienna, Sofia, Tripoli, Warsaw and Lusaka. Of these, only Lusaka lies in Southern hemisphere, hence 1/5 = 20%.

2. 4 There are 11 countries whose names begin with a consonant and are in the Northern Hemisphere. The countries whose names begin with consonants and are in the East (Bulgaria, Brazil,…..) are 13. Hence (4).

3. 1 Countries in S whose names start with vowels: Argentina, Australia, Equador : (3) and number of capital cities starting with vowel is Ottawa and Accra (2).

4. 4 We do not know whether Korea scored a goal in the last 5 minutes, from both statements.

5. 1 The first statement gives us that by adding 4, the number (4, 12, 20…) would be divisible by 8.

6. 1 Solving the first, we get $(x + y)(x + y/xy) = 4$; or $(x + y)^2 = 4xy$; or $(x - y)^2 = 0$,
hence x = y. We cannot get the answer from the second statement.

7. 1 We can arrive at the CP from the first statement. But statement (2) just gives the SP but we do not know the discount.

8. 4 We cannot arrive at the average since we do not know individual scores or number of students.

9. 4 Put different values in the given statements. We find that the question cannot be answered as we get different answers.

10. 3 To make a Venn diagram, we need both statements.

Total = 300.

11. 3 From first statement we get only J's share. Only by combining the statements we get the values of each student.

12. 3 Statement (v): doctor got offer from 3 NIMS, hence choices 1 & 2 are wrong. Statement (iv): D > A and D *not equal to* 2 from statement (ii) Hence D = 3, A = 0. Also Engineer = F since he is not D, S or A. This leaves Samir with 2 calls, Hence (3).

13. 4 Ganesh spends 3.50, A spends Rs 35. Hence A must start with Rs 40 and G = 20 (statement iii). Also D = 20 and S = 30 (statement iv). Hence J = 10. Now A = 40 - 35 = 5, hence (i) is wrong. G = 20 – 3.50 = 16.50, hence (3) is

wrong. Sandeep cannot spend Rs 29 because D cannot spend Rs 27.50, hence (2) is also wrong. Clearly (4) is the only answer that is possible.

14. 1 Draw a diagram for the conditions stated.Clearly, P > G > H.

15. 3 From the statements, we know that Pune = 3, Bangalore = 2, Hyderabad = 1. Loyola is *not equal to* 1, Convent *not equal to* Hyderabad, hence *not equal to* 1 which leaves little flowers = 1 (Hyderabad). Now Loyola *not equal to* 1 *not equal to* Pune, hence Loyola = Bangalore = 2, which gives (3) as answer.

16. 3 We have x = 3 \/xy or x^2 = y. Only choice (1) and (3) are feasible, since 4^2 = 16 Int the ages are less than 10. Choice (1) is also wrong, since we get 3 and 9 Int 10y + x is not divisible by 2. Choice (3) is the answer – the ages are 2 and 4; and 24 – 3 = 21 which is equal to 42 / 2.

17. 1 Total passengers = 180, M = 108, F = 72. Seating capacity of each plane = [2/3 x 180] = 60. After Flight A, 60% of seats (120) are empty, which means 100 boarded Flight A. This leaves 80 for Flight B, of which 40 are women. There are 4 air- hostesses, hence ratio = 10 : 1.

18. 1 Total distance travelled = 10 + 10 + 20 + 40 + 10 = 90. [Divide speed by time at every stage].

19.3 Vertical distance = 10 + 20 + 10 = 40; Horizontal distance = 40 – 10 = 30.

Radial distance = \/(30^2 + 40^2) = 50 km and the direction is North- East.

20. 1 Horizontal distance = 30 (West); Vertical distance = 20 (South).

21. 3 Horizontal distance = 30(West); Vertical distance = 40 (South).
22. 2 BD to AE; AE to AAA. = 0 + 0 = 0.
23. 3 BD to AE; AE to AAB = 0 + 95.2 = 95.2
24. 2 BB to AB; AB to AAG = 311.1 + 0 = 311.1
25. 1 BB to AC; AC to AAA = 451.1 + 314.5 = 765.6
26. 4 6 X 7 X 9 = 378.
27. 2 BE to AE; AE to AAG = 1157.7 + 1035.3 = 2193
28. 3 Dividing earnings in complex by days in complex, we get 5 employees more than 50: nos 51, 58, 64, 72 and 73.
29. 4 There are 25 working days, hence 80% attendance = 20 days. Counting the employees greater than 600 and above 20 days, we get 7 employees.
30. 1 Employee no. 80 earns 1262.79 / 19 in medium = approx. 66, which is the highest among the given employees.
31. 3 There are 7 employees whose earnings in complex and medium must be compared. By usual analysis, the employees whose complex earnings average is greater than average medium earnings are: 51, 58, 64, 71 and 72. Employee no. 79 and 80 do not qualify as their medium earnings are greater.
32. 3 Qualifying amount is 5% of 3374 = 168.7. The number of operations less than this number is 4.

33. 2 The number of operations where more than 200% revenue growth has taken place (increase of 3 times or more) are: Spain (55 to 394) and Latin America (115 to 482). For the others it is less than 200%.
34. 3 There are 5 operations which registered a sustained yearly increase in income – just counting is required.
35. 2 Net income before taxes and charges has increased 5.5 times, from 248 to 1375 in 1998 – 99. Only one unit (Argentina) has increased more than this figure.
36. 2 Only the second statement is true: Profitability in North Sea Operations = 20/52 in 1998 and 54/65 in 1999, an increase from 38 to 83%. None of the other statements are true.
37. 2 Spain's profitability in 2000 is 225/43 = 5.2, which is the highest.
38. 4 The least efficient operation in 2000 is Latin America. Revenue to expense ratio is 482/252 = 1.91, which is the lowest.
39. 4 From the previous questions, we find that the first 3 statements are true. Only statement 4 can be ticked, though rest of the world is the least efficient.
40. 2 Medium qualities Crop 1 and 2 = 6, 7, 8, 9, 13. Only R1 and R4 produce low quality Crop 3 and R5 & R9 produce Crop 4. Hence there are one common region.
41. 3 Crop 3 regions are: 1, 2, 3, 4, 6, 7, 9, 11, 13 of these 1, 2, 3, 4, 9 and 11 produce Crop 4. But 9 and 11 do not produce Crop 2. Hence 4 regions are left.
42. 3 Low Quality Crop 1 : 9, 10, 11. High Quality Crop 4 or medium quality Crop 3 are 3, 10, 11 and 3, 9, 11. Hence 3 regions are common.
43. 2 Considering percentages above, we see that Switzerland has average price of 20/11 which is > 1. All others are less than 1.
44. 2 (16% of 5760) / (15% of 1.055) = 5.60.
45. 2 We get the following ranking table:

	WB	UP	TN	MA	KA	GU	AP
1996 – 97	7	6	2	1	5	3	4
1997 – 98	7	5	2	1	6	4	3
1998 – 99	7	5	2	1	6	4	3
1999 – 2000	7	5	2	1	6	4	3
2000 – 2001	7	4	2	1	6	5	3

All questions can be answered from the above table.

46.2
47.4
48.3
49.1
50.3

SECTION II

51. 3 Numbers of numbers formed less than a million:
One digit = 2
2 – digit = 2 X 3 = 6
3 – digit = 2 X 3 X 3 = 18
4 – digit = 2 X 3 X 3 X 3 = 54
5 – digit = 2 X 34= 162

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6 – digit = 2 X 35= 486.
Adding, we get 728.

52. 3 Let p = q = r = 1 which satisfies the given condition. Then the expression becomes 1/3 + 1/3 + 1/3 = 1. This is the short cut method though the sum can also be done algebraically.

53. 1 $a^6 - b^6 = (a^3 - b^3)(a^3 + b^3) = (a^3 - b^3)(a + b)(a^2 - ab + b^2)$. The expression is always divisible by (a + b).

54. 4 Choosing a black square, we can not take the white square in the same column or row, hence 24. Total number of ways = 24 x 32 = 768.

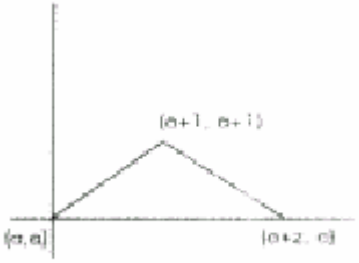
55. 3 Taking $3^2 + 4^2 = 5^2$ (shortcut method, u = 3, v = 4, m = 2). Hence 2 < 3 which is the third choice, m < min (u, v, w).

56. 4 Let the speeds be: E = 2x, N = 4x, S = x. Then d/4x + d/x = 1 or 5d = 4x -> d = 4/5 x. Now N is double = 8x and S = y. Then

$$\frac{d}{8x} + \frac{d}{y} = \frac{20}{60} \text{ ---> } \frac{4x/5}{8x} + \frac{4x/5}{y} = \frac{1}{3} \text{ ---> } \frac{4x}{5y} = \frac{17}{30} \text{ ; } \frac{4x}{y} = \frac{17}{3} \text{ or } \frac{y}{x} = \frac{3}{17} = \frac{1}{6} \text{ approx.}$$

57. 4 Look at the choices to find out a pythogrean triplet. In choice (4) this becomes 3, 4, 5. Then 3 + 4 =7; 7 – 5 =2 = 4/2 hence (4).

58. 2 Plot the points to get (use a = 0)



Base = 2, height = 1. Hence area = 1/2 (2) (1) = 1.

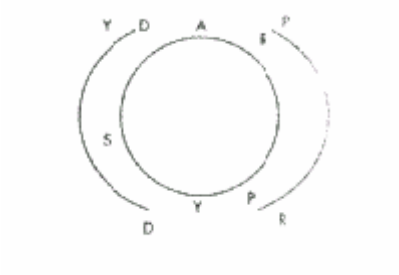
59. 2 In the first case, distance travelled by train and cat respectively are (D) and 3/8x. In the second case it is (D + x) and 5/8 x. Equating the time, we get:

$$\frac{D}{t} = \frac{3/8x}{C} \text{ and } \frac{D+x}{t} = \frac{5/8x}{C}$$

, subtracting; we get ;

$$\frac{x}{t} = \frac{2/8x}{C} \text{ ; } \frac{x}{2/8x} = \frac{t}{C} = 4:1$$

60. 3 The order we get is:



After exchanging position, S will be left of Y.

61. 1 The combinations are: 11 X 10 X 9 X 8 = 7920.

62. 3 One symmetric = 11 X 15 X 14 X 3; Two symmetric = 11 X 10 X 15 X 3, and one symmetric = 11 X 10 X 9. Adding the three, we get 12870.

63. 4 Work from the choices, the number satisfying the conditions is 53, which when divided by 84, would give remainder 53.

64. 4 First step: We find the HCF of the given numbers 9/2, 27/4, 36/5 , , , , which is 9/20 .
Total weight of cake = 9/2 + 27/4 + 36/5 = 369/20. Divide this by HCF to get number
of guests = 369/20 x 9/20 = 41, hence (4).

65. 2 Find the LCM of

$$\left(\frac{5}{2}+1,\ \frac{17}{4}+1\ and\ \frac{41}{5}\right)=73.5$$

66. 3 Solving the given expression, we get $A^2 (x - 1) + B^2 (x) = x (x - 1)$ --> $x^2 - x (1–A–B) + A = 0$. This expression will have 2 roots.

67. 1

$$\frac{2^{256}}{17} \longrightarrow 2^4 = -1 \pmod{17}$$

$$(2^4)^{64} = [-1(\text{mod } 17)^{64}] = (-1)^{64} = 1$$

.

68. 4 The number of regions depends on how the lines are drawn.

69. 4 Substitute some values, say x = 2.8 and y = 1.8. We find that L (x, y) > R (x, y) is not possible while all other choices can be satisfied.

70. 4 Sum of natural nos. =

$$\frac{n(n+1)}{2} = 575 + x \quad \cdot \quad n^2 + n \geq 1150$$

. Substituting values for n, we find that 20 was the number that was missed.

71. 3 He pays Rs 300, so he can rent the car for 6 hours (6 X 50). Or he can use it for < 5 hours and pay Rs 300/12 which is not possible.

72. 2 10 b + a = 10 a + b + 18; hence a – b = 2.

73. 3 $x^2 + 5y^2 + z^2 = 2y (2x + z)$

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==> $x^2 + 4y^2 + z^2 + y^2 - 4xy - 2yz = 0$; $(x - 2y)^2 + (y - z)^2 = 0$; hence $x = 2y$ and $y = z$.

74. 1 $s = 2 + 5x + 9x^2 + \ldots$; $xs = 2x + 5x^2 + 9x^3 + \ldots$; $(1 - x)s = 2x + 3x^2 + 4x^3 + \ldots$..

$x(1 - x)s = 2x^2 + 3x^3 + 4x^4 + \ldots$.; $(1 - x^2)s = 2x + x^2 + x^3 + \ldots$..

$$= x + \frac{x}{1-x} \longrightarrow xs = \frac{x(2-x)}{(1-x)^3}.$$

75. 3 24 + 14 = 38, of which they did something on 22 days; 38 – 22 = 16 days. Total days = 16 + 14 = 30.

76. 4 No. of two's = 6; minus 4's = (4). Hence 6 – 4 =2.

77. 3 Total fruits in the basket = 19; less taken out = 4 X 2 = 8. Hence 19 – 8 =11.

78. 4 $48(x - y) = x^2 - y^2$ ==> $x + y = 48$.

79. 1 First he gathers the stones at the fifth stone. He goes 8 + 12 + 8 + 4 = 32 m. Then he carries 5 stones one by one over a distance of 92 m; 92 X 2 X 4 = 828 + 32 = 860 m.

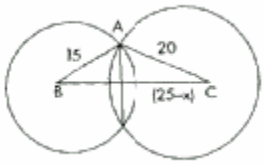
80. 4 Area of ungrazed portion= square – (4 quarter circles) – circle= $14^2 - \pi(7)^2 - 20 = 22$

81. 2

$$f(x) + f(y) = \log\frac{(1+x)(1+y)}{(1-x)(1-y)} = \log\frac{1+xy+x+y}{1+xy-(x+y)}$$

$$= \log\frac{1+\frac{x+y}{1+xy}}{1-\frac{x+y}{1+xy}} = \log\left(\frac{x+y}{1+xy}\right) = f\left(\frac{x+y}{1+xy}\right).$$

82. 1



$15^2 = AP^2 + x^2$

$20^2 = AP^2 + (25 - x)^2$ (Using Pythagorean identity)

Solving the 2 equations, we get $x = 16$ and 9. Hence $AP^2 = 15^2 - 9^2 = 144$. $AP = 12$ and therefore common chord = 24.

83. 2

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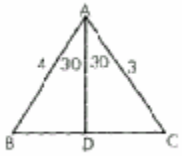

Using cos formula,Cos 60 =

$$\frac{b^2 + c^2 - a^2}{2bc} = \frac{16 + 9 - a^2}{24} = \frac{1}{2}$$

hence a = \/13
Using Appolonius, we get
AB X AC – BD X DC = AD^2

$$12\left(1 - \frac{13}{49}\right) = AD^2 \; ; \; DC = \frac{3\sqrt{13}}{7} \; ; \; \frac{36\,X\,12}{49} = AD^2, \; AD = \frac{12\sqrt{3}}{7}$$

; .

84. 4 (1 X 9 X 8 + 2 X 8 X 7 + 3 X 7 X 6 + …..) = 180.
85. 2 Ratio of speed = 3 : 2; Large pump takes 2 hours, small pump takes 3 hrs. Hence, if 4 pumps work together, we get 3(1/3) + 1/2 = 3/2 . Required ratio of work = 2/3 , which means that the large pump fills the 1/3 tank.

86. 2 (200 + 2x) (2.00 – x). Maximising this function, we get 300. Check: 300 X 1.50 = 450, which is the maximum amount.
87. 4 If no employee were added, it would take 10 hrs. After 5 pm, one more man is added. Total work = 60. Work done up to 5 pm = 6 X 6 = 36. Remaining work = 24, which is done in consecutive hours by 7 + 8 + 9 workers, hence taking 3 hours more.
88. 3 Using the given figure, we get $DC^2 = 400 – (25 – x)^2 = 225 – x^2$. Hence AD = 9 and DB = 16. Using Pythagorous again, we get DC = 12. Then, we use A = rS of (triangle ADC). Hence r X 18 = 54, or r = 3. Similarly we get r = 4 for the bigger circle. PQ = $r_1 + r_2$ = 3 + 4 =7.
89. 2 Total loaves = 5 + 3 = 8. Each gets 8/3 each. First gets, 5 - 8/3 = 7/3 . Second gets, 3 - 8/3 = 1/3 . Money should be divided in the ratio 7 : 1.
90. 3 3x + x + (3 x – 23) = 40 x = 9; shortest piece = 27 – 23 = 4.
91. 4 Since angle B = 90, we get BC = 2x. EO = OH = x. KL = 1/2 x. Tan of angle FGO = x / (1/2)x = 2. Hence none.
92. 3 Construct perpendicular lines and count the regions. The ratio of the quadrangles ABCD : DEFG = 12 : 7
93. 2 M = 1/2 (Mi + L + J). Add M on both sides to get 3M = M + Mi + L + J; hence M = 60/3 = 20. Similarly Mi = 15, L = 12, J = 13.
94. 2 Work from the choices. Only choice (2) gives the right answer.

20 16

10 6
5 1 .

95. 3 Area left after 1st round = 800 – 116 = 684.
Area left after 2nd round = 800 – 116 = 576.
Area left after 3rd round = 800 – 324 = 476.
Hence it takes more than 3 rounds to arrive at 400.

96. 2 $(x + y + z)^2 = 25 \Rightarrow x^2 + y^2 + z^2 = 2 (xy + yz + xz) = 25 \Rightarrow x^2 + y^2 + z^2 = 19$. To maximise x, y and z = 0. Hence x = \/19

97. 4 Substitute n = 1, 2 to get the answer.

98. 2 Using the choices, we get $(5 + 4)^2 = 81$ and 81 – 27 = 54.

99. 3 AB = 20; $AG_1 = BG_3$; $2G_1G_2 = G_2G_3$; y + 2 y = 20 – 2x; y = 5. Time taken AG_3 @60 kmph = 17.5 min
20 + 17.5 + 1 = 38.5 min. Diff = 1.5 min

100. 4 If BE = 1, BC = 4 since EC = 3 BE. Hence area of the region = 14 X 4 = 56

Section III

101. (1)	102. (4)	103. (1)	104. (3)
105. (1)	106. (3)	107. (2)	
108. (3)	109. (2)	110. (3)	111. (1)
112. (4)	113. (3)	114. (1)	
115. (4)	116. (2)	117. (2)	118. (1)
119. (4)	120.)	121.)	
122. (2)	123. (4)	124. (2)	125. (4)
126. (4)	127. (1)	128. (1)	
129. (2)	130. (1)	131. (2)	132. (2)
133. (4)	134. (4)	135. (3)	
136. (4)	137. (3)	138. (2)	139. (3)
140. (1)	141.)	142. (3)	
143. (4)	144. (1)	145. (3)	146. (2)
147. (4)	148. (2)	149. (4)	
150. (1)			