

# CAT 1990 based PAPER

## SOLUTIONS

1-2 :

Students please note that the best way to answer this question is by finding generally what would ensure a win for B. If B has to win, A has to pickup the last matchstick. This can be forced upon A if there are 2 or 3 matchsticks left on the table when it is B's turn. As then, B could pickup 1 or 2 matchsticks and force upon A to pickup the last one. For this to happen there should always be odd number of matchsticks initially. Eg. If there are 7 match sticks initially any of the following combinations will leave either 2 or 3 matchsticks on the

table when it is B's turn.

A	B	B	A			
1	2	3	4	5	6	7

A	B	B	A	A		
1	2	3	4	5	6	7

A	A	B	A			
1	2	3	4	5	6	7

A	A	B	A	A		
1	2	3	4	5	6	7

Hence the smallest value of N (greater than 5) to ensure a win for B is 7. Also the largest value of N (less than 50) to ensure a win for B is 49.

1. a

2. d

3. a For the bird keeper to figure out that at least 1 pigeon had escaped, the number of mynahs has to be less than 7. In other words,  $y < 7$ . Hence the pair (10,8) is not a valid one.

4. b The last digit of the powers of 2 repeat in the order 2, 4, 8, 6, 2, 4, 8, 6 ... Thus every power of 2 which is a multiple of 4 has last digit 6. The 60th power will hence have 6 as the last digit, and hence the remainder when divided by 5 is 1.

5. c If we find the repeated square root of a positive integer, the answer always tends to 1.

6.c

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{100 \times 101} = \left(1 - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \dots + \left(\frac{1}{99} - \frac{1}{100}\right) + \left(\frac{1}{100} - \frac{1}{101}\right) = 1 - \frac{1}{101} = \frac{100}{101}.$$

7. a

$$\frac{1}{1-x} + \frac{1}{1+x} + \frac{2}{1+x^2} + \frac{4}{1-x^2} = \frac{2}{1-x^2} + \frac{2}{1+x^2} + \frac{4}{1-x^4} + \frac{4}{1+x^4} = \frac{4}{1-x^4} + \frac{4}{1+x^4} = \frac{8}{1-x^8}.$$

8. a Students please note that the best way to solve this example is the method of reverse substitution. And hence we find that the answer is (a).

9. b If there is only one box containing black ball, the boxes can be filled in 6 ways. If there are two boxes containing black ball, the boxes can be filled in 5 ways. (The two black balls in either of the boxes (1,2), (2,3), (3,4), (4,5), (5,6)). If there are 3 boxes containing black ball the boxes can be filled in 4 ways viz.(123), (234), (345), (456). Similarly if there are 4 boxes, it can be done in 3 ways viz.(1234), (2345), (3456), if there are 5 boxes it can be done in 2 ways viz.(12345), (23456) and all 6 boxes can have a black ball only in 1 way. Hence total number of ways =  $6+5+4+3+2+1 = 21$ .

10. b

The successive values of x and y are as follows:

Cycle	X	Y	XY	Y+1
1	1	2	2	3
2	2	3	6	4
3	6	4	24	5
4	24	5		

11. a Let there be 100 products in the stockpile. Hence products from M1 = 40, from M2 = 30 and from M3 = 30. Number of defective products from M1 =  $0.03 \times 40 = 1.2$ , from M2 =  $0.01 \times 30 = 0.3$  and from M3 =  $0.05 \times 30 = 1.5$ . Therefore total number of defective products = 3, and percentage defective = 3%.

12. b

$$x^*x = 1.5x - x^2 \text{ and } y^*y = 1.5y - y^2.$$

$$\text{For } x^*x < y^*y \text{ to be true, } 1.5x - x^2 < 1.5y - y^2$$

$$\Rightarrow x(1.5 - x) < y(1.5 - y)$$

Option I:  $1 > x > y$

Thus,  $x^*x$  and  $y^*y$  must be greater than 0.5.

$$\text{If } x = 0.6 \text{ and } y = 0.9$$

$$\text{In this case } x^*x = y^*y$$

Thus, this condition is not always true.

Option II:  $x > 1 > y$

Here,  $y^*y$  must be greater than 0.5 and  $x^*x$  must be less than 0.5.

This condition is always true.

Option III:  $1 > y > x$

Thus,  $x^*x$  and  $y^*y$  must be greater than 0.5.

$$\text{If } x = 0.6 \text{ and } y = 0.9$$

$$\text{In this case } x^*x = y^*y$$

Thus, this condition is not always true.

Option IV:  $y > 1 > x$

Here,  $x^*x$  must be greater than 0.5 and  $y^*y$  must be less than 0.5.

This condition can never be true.

13. a

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Since the summation of all terms =  $p/(p - 1) = -p/(1 - p)$ , this looks familiar to the formula of summation of a GP of a infinitely diminishing series viz.  $a/(1 - r)$ . Comparing the two formulae, we get  $a = -p$  and  $r = p$ .  $f(k)$  is the  $k$ th term of this series given by  $ar^{(k-1)}$ . Hence  $f(k) = -p \times p^{(k-1)}$

14. a There are 116 players in all. If we have to choose 1 winner, there have to be 115 losers in all. And since 1 match gives 1 loser, there has to be 115 matches to be played in all in the tournament.

15. c

$n^3 - n = n(n^2 - 1) = (n - 1)n(n + 1) =$  product of three consecutive numbers. So at least one number is even, and one number is a multiple of 3. So the product is divisible by 6. Students please note that can also be done by the method of simulation i.e choosing any value of  $n$  and verifying the answer choices. However you need to be careful in choosing the values. You may choose such a value that the answer is divisible by 12 and hence also by 6.

Alternatively, you may choose to eliminate answer choices by using the above rule. If a number is divisible by 12, it also has to be divisible by 6. Since both of them cannot be the answer you can eliminate option (a). Also if a number is not divisible by 6, it will not be divisible by 12 either and hence you can eliminate option (d) as well.

16. b

$(1 - d^3) / (1 - d) = (1 - d)(1 + d + d^2)/(1 - d) = (1 + d + d^2)$  If  $d > 1$ , then  $d^2 > 1$  and  $(1 + d + d^2) > 3$ . Hence (b) is the right answer.

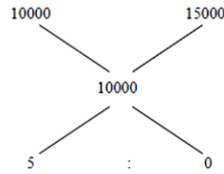
17. c

Let Gopal have Rs. 400. The price of an orange is then Rs. 8 and that of a mango is Rs.10. If he keeps 10% of the money for taxi fare, he is left with Rs.360. Now if he buys 20 mangoes i.e. if he spends 200 Rs., he is left with Rs.160, in which he can buy 20 oranges.

18. b

For maximising profits, we have figured out that he should stock 60 TV's and 40 VCR's. Now per TV he is making a profit of  $(12200 - 10000) =$  Rs.2200 and per VCR he is making a profit of  $(18300 - 15000) = 3300$ . So his profit will be  $(2200 \times 60) + (3300 \times 40) = 264000$  i.e. 2.64 lakhs.

19. c If 20 more items are stocked, the average cost per piece would now be  $1200000/120 =$  Rs.10000. Now if we alligate we get the ratio VCR's and TV's is 0.



20. a For maximising profits, we have figured out that he should stock 60 TV's and 40 VCR's. Now per TV he is making a profit of  $(12200 - 10000) =$  Rs.2200 and per VCR he is making a profit of  $(18300 - 15000) = 3300$ .

So his profit will be  $(2200 \times 60) + (3300 \times 40) = 264000$  i.e. 2.64 lakhs.

21. d The answer cannot be determined as the data for only five states is given and we don't know the excise duty rates for other states.

22. d We have been given the total value in the graph, but nothing is mentioned about the amount of liquor manufactured by states other than TN..

23. c Since Excise duty is levied on the total value of liquor produced by the 5 distillaries, this will be in the same order as the order of the amount of the liquor produced by them (as the excise duty rate remains constant). Hence the correct order is DCEBA.

24. b The simple average annual growth for the 5 distilleries in TN is as shown :

Distillery	Calculation	Rate
A	$(12.89 - 6.41)/(6.41 \times 2)$	50.54%
B	$(12.07 - 3.15)/(3.15 \times 2)$	141.58%
C	$(11.92 - 1.64)/(1.64 \times 2)$	313.41%
D	$(5.79 - 1.05)/(1.05 \times 2)$	225.71%
E	$(4.21 - 2.45)/(2.45 \times 2)$	35.91%

So the distillery with highest growth rate is C and with lowest growth rate is E. So had the amount of liquor manufactured by E grown by 313.41% in the 2 year period ie. Grown by 616.82% overall its supply in 1998 would be  $(2.45 \times 616.82 / 100) = 15.11$  liters.

25. a  $(100.5 + 67 + 141 + 143.9 + 65)/5 = 103.48$

26. a The key here is figuring out that the only performance which is less than the 1985 performance is the 1988 performance. Hence the percentage corresponding to 1988 should be less than 100. Thus we see that (c) cannot be the answer. Also (b) cannot be the answer as it shows two of the years having less than 100%. Between options (a) and (d), the correct answer is (a), This is so because the difference between

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the 1985 and 1988 performance is only 2 units on 67 units. Hence percentage wise it has to be 97% and not 68%.

27. b The highest percentage decline over the previous year is seen for the year 1988, as in this year the performance almost halved. In other year you won't find this happening.

28.a

Year	Consumption of chemical fertilizers	Gross c
84-85	$(3.68+1.21+0.62) = 5.51$	
85-86	$(4.07+1.32+0.67) = 6.60$	
86-87	$(4.22+1.44+0.73) = 6.39$	
87-88	$(5.20+1.73+0.78) = 7.71$	

Hence the ratio is lowest for 84-85.

29. a I can be seen that in the year 88-89, area cropped shows a decline for 3 of the crops viz.wheat, jowar and bajra. This is the maximum number of crops for any year.

30. d The amount area brought under irrigation for Major and Medium in 86-87 =  $(24 - 23.2) = 0.8$

The amount area brought under irrigation for Minor in 86-87 =  $(34.2 - 32.77) = 1.43$

Hence total area brought under irrigation in 86-87 =  $0.8+1.43 = 2.23$  million hectares.

31. c Psychoanalysis has been referred to a curative system for mental healing.

32. c Behaviorism bid for approval by reducing adjustment to a program of conditioning while psychoanalysis analysed mental factors.

33. b The passage states that psychoanalysis created for itself a considerable following among those content with traditional methods and attitudes.

34. c Create a belief in the theory and facts will create themselves.

35. c Psychoanalysts believe that practice is entirely a derivative of theory.

36. d Freudian psychoanalysis was neglected by academic psychology because orthodox psychology largely ignored dreams, lapses and neuroses.

37. b The mission of psychoanalysis has been described as humanistic and one that was the most novel and releasing of the curative systems that mark the history of mental healing.

38. d The psychoanalytical movement became popular due to its exploration of intimate problems of human relations.

39. d Computers produce by accident sequences of words that e recognize as poetry.

40. c Both can be organized to solve problems and both have a similar mose of communication.

41. d The comparison between the two depends upon what the two can do.

42. d The author says that there is no sharp break of continuity between what is human and what is mechanical.

43. b The author implies that computers are not yet capable of producing poetry.

44. b The mode of communication is very similar in both.

45. d Just as one pays rent when one takes something on a lease, one pays interest on borrowing something, pays salary on employing someone and pays a price to buy something. But one does not pay tax on governing someone.

46. d In all other pairs the first word is used to measure the second.

47. b Just as a progressive person leads to progress, the second word of the pair in all other choices except b. leads to the first word of the pair. A sympathizer 'gives', and not 'leads to' sympathy.

48. b All others pairs have words that are opposites of each other.

49. d In all other pairs, the first word holds the second together. For example clips hold papers together and a ribbon holds hair together. But vegetables are put inside a bag.

50. c Choice c. is the most concise and appropriate sentence. Others are vague, confusing or too wordy.

51. c All other options are either confusing or unnecessarily wordy. Choice c. uses the phrase 'are better in quality' instead of a more appropriate 'are of better quality' as used in choice b.

52. c Choice c. uses the simplest and most concise words.

53. b Choice b. uses the appropriate degree of politeness. Choice d. is wrong as it does not tell how much milk powder is required. Others are overtly polite.

54. c 'Whenever' implies at any time, hence c. is a better choice than d. Other choices are unnecessarily wordy.

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55. b 'Unexpected' and 'unanticipated' are synonyms, so using both in a sentence is redundant. Moreover 'consequence' is a better word to suggest the result of something on something else.

56. c If some of my closest friends are aardvarks, but all of them disapprove of me, it implies that some of those who disapprove of me are aardvarks.

57. c All those who achieve good ends are happy and all young people achieve good ends. Therefore all young people are also happy

58. d If some learned men are candid but all candid men recognize merit in a rival, it follows that some men recognize merit in a rival are learned.

59. a Because all roses are plants and all plants need air, it follows that roses need air.

60. b If all men are men of scientific genius and some men are men of artistic ability, it follows that all the men of artistic ability are men of scientific genius.