

CAT 2005 Actual Paper

ANSWERS and EXPLANATIONS

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

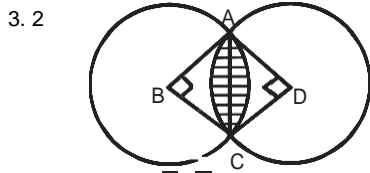
	Question number	Total questions	Total attempted	Total correct	Total wrong	Net Score	Time Taken
QA	1 to 30	30					
EU + RC	31 to 60	30					
DI + DS + AR	61 to 90	30					
Total		90					

1. 1 $x = 16^3 + 17^3 + 18^3 + 19^3$ is even number
 Therefore 2 divides x.
 $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
 $\Rightarrow a + b$ always divides $a^3 + b^3$
 Therefore $16^3 + 19^3$ is divisible by 35
 $18^3 + 17^3$ is divisible by 35
 Hence x is divisible by 70.
 Hence option (1)

2. 3

A	B	C	D
-20	20		
90		-90	
-10			10
		-50	50
	-100	100	
	110		-110
Total +60	30	-40	-50

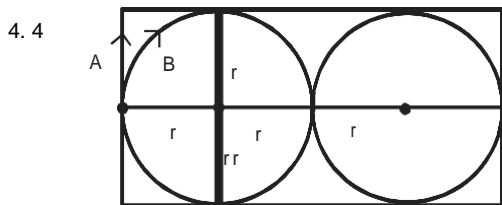
D gets emptied first, it gets emptied in 20 minutes.
 Hence option (3)



Shaded area = $2 \times (\text{area of sector ADC} - \text{area of } \triangle ADC)$

$$= 2 \times \left(\frac{\pi}{4} \times 1^2 - \frac{1}{2} \times 1 \times 1 \right) = \frac{\pi}{2} - 1$$

Hence option (2)



A covers $2r + 2r + 4r + 4r = 12r$

B covers $2\pi r + 2\pi r = 4\pi r$ distance

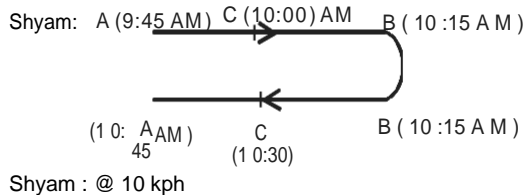
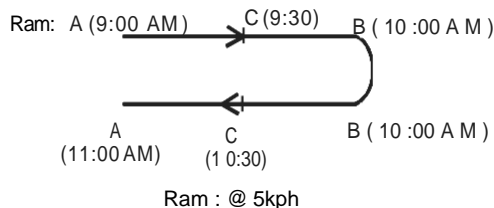
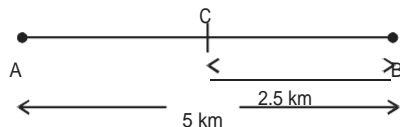
$$\frac{4\pi r}{SB} = \frac{12r}{SA} \Rightarrow SB = \frac{\pi}{3} SA$$

$$\frac{SB - SA}{SA} \times 100 = \frac{\pi - 3}{3} \times 100 = 4.72\%$$

Hence Option (4)

5. 1 Let there be m boys and n girls
 $nC_2 = 45 = \frac{n(n-1)}{2} \Rightarrow n(n-1) = 90 \Rightarrow n = 10$
 $mC_2 = 190 \Rightarrow \frac{m(m-1)}{2} = 190 \Rightarrow m(m-1) = 380 \Rightarrow m = 20$
 Number of games between one boy and one girl
 $= {}^{10}C_1 \times {}^{20}C_1 = 10 \times 20 = 200$
 Hence option (1)

Questions 6 and 7:



6. 2 It is clear that Ram & Shyam shall meet each other between C & B, sometime after 10:00 AM. At 10:00 AM they are moving as shown below:

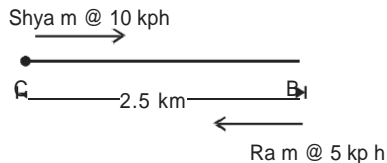


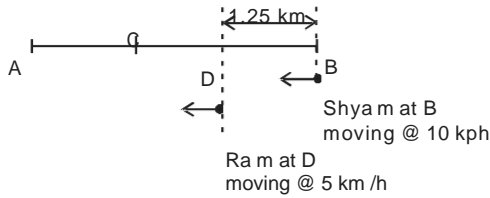
Fig. at 10:00 AM

$$\text{From now, time taken to meet} = \frac{2.5}{(10 + 5)} \times 60 \text{ min} = 10 \text{ minutes}$$

So, they meet each other at 10:10 AM.

7. 2 It is clear from the diagram that at 10:30; Shyam overtakes Ram.

Alternate: At 10:15 the situation is as show:



$$\text{Time taken for Shyam to overtake Ram} = \frac{1.25}{(10-5)} \times 60$$

= 15 min.

⇒ Shyam overtakes Ram at 10:30 AM.

$$8. 4 \quad R = \frac{30^{65} - (30-1)^{65}}{30^{64} + (30-1)^{64}} = \frac{30^{65} - 30^{65} \left(1 - \frac{1}{30}\right)^{65}}{30^{64} + 30^{64} \left(1 - \frac{1}{30}\right)^{64}}$$

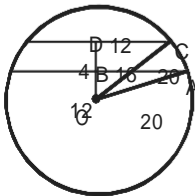
$$\text{or } R = \frac{36^{65} \left\{ 1 - \left(1 - \frac{1}{30}\right)^{65} \right\}}{30^{64} \left\{ 1 + \left(1 - \frac{1}{30}\right)^{64} \right\}}$$

$$R = 30 \left\{ \frac{1 - (0.96)^{65}}{1 + (0.96)^{64}} \right\}$$

$$\text{in } \frac{1 - (0.96)^{65}}{1 + (0.96)^{64}}$$

N^r is only slightly less than 1.
& D^r is only slightly more than 1. R is slightly less than 36 but certainly greater than 1.

9. 4 **Case I:** Chords on same side of the centre.



$$OB^2 = OA^2 - AB^2 = 20^2 - 16^2 = 144$$

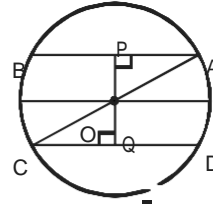
$$OB = 12$$

$$OD^2 = 20^2 - 12^2 = 400 - 144 = 256$$

$$OD = 16$$

$$BD = 4 \text{ cm}$$

Case II: Chords on opposite side of the centre.



$$AB = 32 \text{ cm}$$

$$CD = 24 \text{ cm}$$

$$OP = \sqrt{AO^2 - AP^2} = \sqrt{(20)^2 - (16)^2}$$

$$OP = 12 \text{ cm}$$

$$\& OQ = \sqrt{(OC)^2 - (CQ)^2} = \sqrt{(20)^2 - (12)^2}$$

$$OQ = 16 \text{ cm}$$

$$\text{Distance} = PQ = 12 + 16 = 28 \text{ cm.}$$

$$10. 3 \quad y^2 = x^2$$

$$2x^2 - 2kx + k^2 - 1 = 0$$

$$D = 0$$

$$\Rightarrow 4k^2 = 8k^2 - 8$$

$$\Rightarrow 4k^2 = 8$$

$$k^2 = 2 \Rightarrow k = \pm \sqrt{2} \text{ with } k = +\sqrt{2} \text{ gives}$$

$$\text{the equation} = 2x^2 - 2\sqrt{2}x + 1 = 0;$$

$$\text{root is : } \frac{-b}{2a} = +\frac{\sqrt{2}}{2} \text{ but with } k = -\sqrt{2},$$

$$\text{the equation is } = 2x^2 + 2\sqrt{2}x + 1 = 0 \text{ root is:}$$

$$-\frac{\sqrt{2}}{2} \text{ as this root is -ve, will reject } k = -\frac{\sqrt{2}}{2}.$$

$$\text{Only answer is: } \Rightarrow k = +\frac{\sqrt{2}}{2} \text{ only.}$$

Alternate: Graph based.

$x^2 - y^2 = 0$ & $(x - k)^2 + y^2 = 1$ are plotted below:

We are solving for a unique positive x .

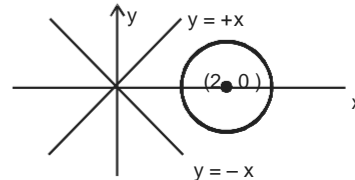
$$x^2 - y^2 = 0$$

is a pair of straight lines

$$y = x \text{ \& } y = -x$$

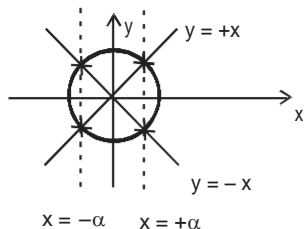
$(x - k)^2 + y^2 = 1$ is a circle

with center $(k, 0)$ & radius 1.



(1) $k = 2$;
clearly, no solution

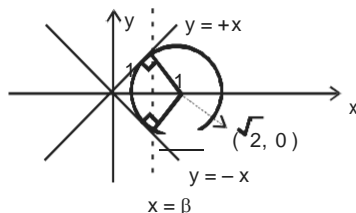
(2) $k = 0$



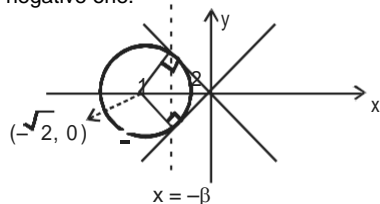
$x = \alpha, -\alpha$
two solutions.
rejected.

(3) $k = +\sqrt{2}$

unique value of x & a positive one as shown.



(4) $k = -\sqrt{2}$, also gives the unique value of x but it is negative one.

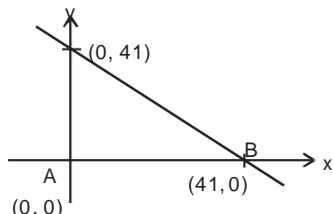


11. 4 If $p = 1! = 1$
Then $p + 2 = 3$ when divided by $2!$ remainder will be 1.
If $p = 1! + 2 \times 2! = 5$
Then $p + 2 = 7$ when divided by $3!$ remainder is still 1.
Hence $p = 1! + (2 \times 2!) + (3 \times 3!) + \dots + (10 \times 10!)$ when divided by $11!$ leaves remainder 1

Alternative method:

$P = 1 + 2.2! + 3.3! + \dots + 10.10!$
 $= (2-1)1! + (3-1)2! + (4-1)3! + \dots + (11-1)10!$
 $= 2! - 1! + 3! - 2! + \dots + 11! - 10! = 1 + 11!$
Hence the remainder is 1.

12. 1



equation of line $\equiv x + y = 41$. If the (x, y) co-ordinates of the points are integer, their sum shall also be integers so that $x + y = k$ (k , a variable) as we have to exclude points lying on the boundary of triangle; k can take all values from 1 to 40 only. $k = 0$ is also rejected as at $k = 0$ will give the point A; which can't be taken.

Now, $x + y = k$, ($k = 1, 2, 3, \dots, 40$)
with $k = 40$; $x + y = 40$; taking integral solutions.
We get points $(1, 39), (2, 38); (3, 37) \dots (39, 1)$
i.e. 39 points

1) $x + y = 40$ will be satisfied by 39 point is
similarly $x + y = 39$ is satisfied by 38 points
 $x + y = 38$ by 37 point
 $x + y = 3$ by 2 points
 $x + y = 2$ is satisfied by 1 point
 $x + y = 1$ by no points.

So, the total no. of all such points is:

$$39 + 38 + 37 + 36 + \dots + 3 + 2 + 1 = \frac{39 \times 40}{2} = 780 \text{ points}$$

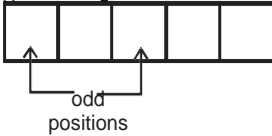
13. 2 Let $A = abc$, then $B = cba$
Given, $B > A$ which implies $c > a \dots (1)$
as $B - A = (100c + 10b + a) - (100a + 10b + 1)$
 $B - A = 100(c - a) + (a - c)$
 $B - A = 99(c - a)$ and $(B - A)$ is divisible by 7;
as 99 is not divisible by 7 (no factor like 7 or 7^2)
therefore $(c - a)$ must be divisible by 7 {i.e., $(c - a)$ must be 7, 7^2 etc.} as c & a are single digits. $(c - a)$ must be 7 only, the possible values (c, a) {with $c > a$ } are $(9, 2)$ & $(8, 1)$, with this we can write A as
 $A : abc = 1b8$ or $2b9$
as b can take values from 0 to 9, the smallest & largest possible value of are:
 $A_{\min} = 108$
& $A_{\max} = 299$
only (2) satisfies so (2) is the ans.

14. 3 $a_1 = 1, a_{n+1} - 3a_n + 2 = 4n$
 $a_{n+1} = 3a_n + 4n - 2$
when $n = 2$ then $a_2 = 3 + 4 - 2 = 5$
when $n = 3$ then $a_3 = 3 \times 5 + 4 \times 2 - 2 = 21$
from the options, we get an idea that a_n can be expressed in a combination of some power of 3 & some multiple of 100.
(1) $3^{99} - 200$; tells us that a_n could be: $3^{n-1} - 2 \times n$;
but it does not fit a_1 or a_2 or a_3
(2) $3^{99} + 200$; tells us that a_n could be: $3^{n-1} + 2 \times n$;
again, not valid for a_1, a_2 etc.
(3) $3^{100} - 200$; tells $3^n - 2n$: valid for all a_1, a_2, a_3 .
(4) $3^{100} + 200$; tells $3^n + 2n$: again not valid.
so, (3) is the correct answer.

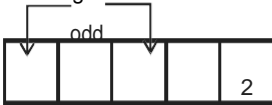
15. 2

leftmost digit (LMD) right most digit (RMD)
odd positions can be counted in 2 ways.

(i) Counting from the LMD-end:



We have 1, 2, 3, 4 & 5 to be filled in these blocks. Odd nos. (1, 3, 5) to be filled in at odd positions. Other places are to be filled by even nos. (2 or 4) Let's count, how many such nos. are there with 2 at the unit's digit



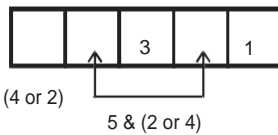
Odd nos. can be filled in ${}^3P_2 = 6$ way. The remaining two places are to be filled by 2 nos. (one odd no. left out of 1, 3, 5 & one even i.e. 4) in = 2 ways.

So, there are $6 \times 2 = 12$ number with 2 at the rightmost place. Similarly; there are 12 such nos. with 4 at the rightmost digits.

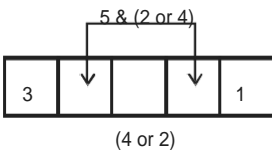
The sum of rightmost digits in all such number = $12(2 + 4) = 72$

(ii) Now counting from the RMD-end.

Let's place 1 at the units place and check, how many nos. are possible with (1, 3) at the odd positions:



No. of such cases = $2 \times 2 = 4$ ways.



Here again no. of ways = $2 \times 2 = 4$ ways

So, there are $4 + 4 = 8$ nos, in which (1, 3) are at odd positions. Similarly there are 8 nos. in which (1, 5) are at odd positions. So, in all there are 16 nos. where 1 is at unit's place. Similarly there are 16 nos. with 3 at unit's place and 16 more with 5 at unit's place.

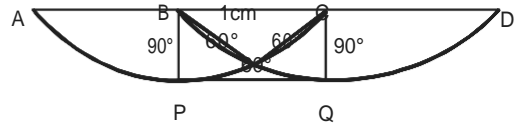
Summing up all the odd unit's digits = $16(1 + 3 + 5) = 144$

From (i) and (ii) we can now, sum up all (even or odd) nos. at units place = $72 + 144 = 216$

Hence answer is (2)

16. 1 $((30)^4)^{680} = (8100)^{680}$.
Hence the right most non-zero digit is 1.

17. 2



Drawn figure since it have not to be within distance of 1 m so it will go along APQD, which is the path of minimum distance.

$$AP = \frac{90}{360} \times 2\pi \times 1 = \frac{\pi}{2}$$

$$\text{Also } AP = QD = \frac{\pi}{2}$$

So the minimum distance = $AP + PQ + QD$

$$= \frac{\pi}{2} + 1 + \frac{\pi}{2} = 1 + \pi$$

18. 4 $P = \log_x \left(\frac{x}{y} \right) + \log_y \left(\frac{y}{x} \right)$

$$= \log_x x - \log_x y + \log_y y - \log_y x$$

$$= 2 - \log_x y - \log_y x$$

Let, $t = \log_x y$

$$\Rightarrow p = 2 - \frac{1}{t} - t = - \left[\sqrt{t} - \frac{1}{\sqrt{t}} \right]^2$$

Which can never be positive, out of given option it can't assume a value of +1. So (4) is ans.

19. 4 $10 < n < 1000$

Let n is two digit number.

$$n = 10a + b \Rightarrow p_n = ab, s_n = a + b$$

$$\text{Then } ab + a + b = 10a + b$$

$$\Rightarrow ab = 9a \Rightarrow b = 9$$

There are 9 such numbers 19, 29, 39, ... 99

Then Let n is three digit number

$$\Rightarrow n = 100a + 10b + c \Rightarrow p_n = abc, s_n = a + b + c$$

$$\text{then } abc + a + b + c = 100a + 10b + c$$

$$\Rightarrow abc = 99a + 9b$$

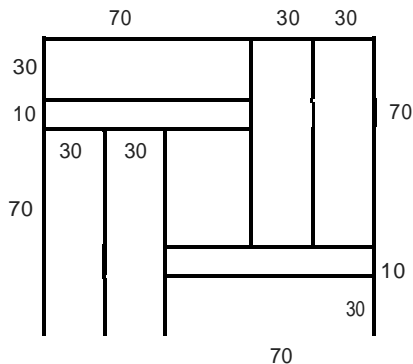
$$\Rightarrow bc = 99 + 9 \frac{b}{a}$$

But the maximum value for $bc = 81$ (when both b & c are 9 i.e.)

And RHS is more than 99. Hence no such number is possible.

Hence option (4).

20.3

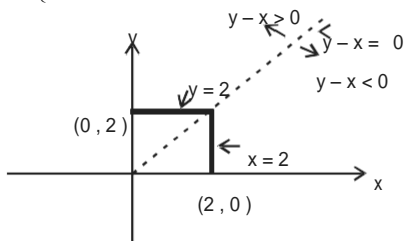


21.3

$|x + y| + |x - y| = 4$
 Replace "+x" by "-x" & "+y" by "-y" everywhere in the curve: we again get the same equation.
 \Rightarrow curve is symmetric in the 4-quadrants of X-Y plane.
 In I-quadrant ($x, y > 0$)
 $|x + y| + |x - y| = 4$

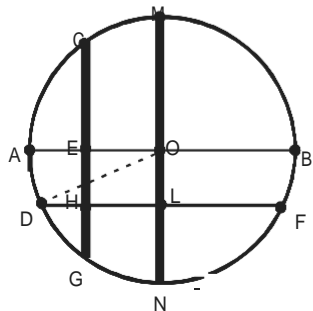
$$= \begin{cases} (x + y) + (y - x) = 4; y > x \\ (x + y) - (y - x) = 4; y < x \end{cases}$$

or $\begin{cases} y = 2; y > x \\ x = 2; y < x \end{cases}$



We can now plot graph:
 Area in I-quadrant = $(2)^2 = 4$ unit²
 total area of $|x + y| + |x - y| = 4$ is:
 $4 \times$ (area of I-quadrant) = $4 \times 4 = 16$ sq. unit.

22.2



AE = 1 cm, BE = 2 cm & NL = 1 cm, ML = 2 cm
 $HL = OE = \frac{1}{2}$

DL = DH + HL

$$DL = DH + \frac{1}{2}$$

OB = AO = radius = 1.5

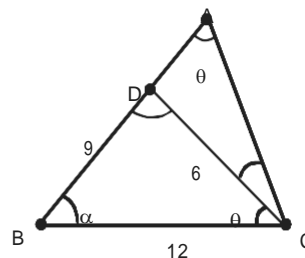
$$DO^2 = OL^2 + DL^2$$

$$\left(\frac{3}{2}\right)^2 = \left(\frac{1}{2}\right)^2 + \left(DH + \frac{1}{2}\right)^2$$

$$\Rightarrow \left(DH + \frac{1}{2}\right)^2 = 2 \Rightarrow DH = \sqrt{2} - \frac{1}{2}$$

Hence option (2)

23.1



Here $\angle ACB = \theta + [180 - (2\theta + \alpha)] = 180 - (\theta + \alpha)$

So here we can say that triangle BCD and triangle ABC will be similar. $\triangle BCD \sim \triangle BAC$
 Hence from the property of similarity

$$\frac{AB}{12} = \frac{12}{9} \text{ Hence } AB = 16$$

$$\frac{AC}{6} = \frac{12}{9} \text{ Hence } AC = 8$$

Hence AD = 7

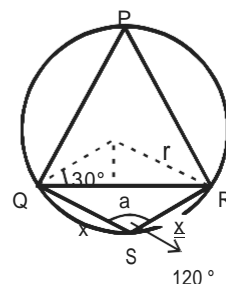
AC = 8

$$S_{ADC} = 8 + 7 + 6 = 21$$

$$S_{BDC} = 27$$

Hence $r = \frac{21}{27} = \frac{7}{9}$

24.1



Here $\cos 30^\circ = \frac{a}{2r}$

$a = r\sqrt{3}$

Here the side of equilateral triangle is $r\sqrt{3}$

From the diagram $\cos 120^\circ = \frac{x^2 + x^2 - a^2}{2x^2}$

$a^2 = 3x^2$

$x = r$

Hence the circumference will be $2r(1 + \sqrt{3})$

Hence answer is (1).

25. 1 The 100th and 1000th position value will be only 1 .
Now the possibility of unit and tens digits are (1, 3), (1, 9), (3, 1), (3, 7), (5, 5), (7, 3), (7, 9), (9, 1), (9, 7).

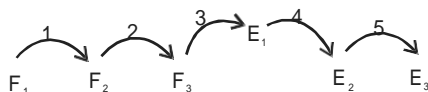
26. 3 $x = \sqrt{4 + \sqrt{4 - x}} \Rightarrow x^2 = 4 + \sqrt{4 - x}$

$(x^2 - 4) = \sqrt{4 - x}$

Now put the values from options.
Only 3rd option satisfies the condition.

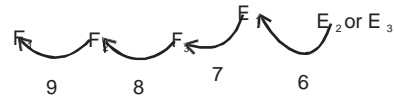
27. 4 $g(x + 1) + g(x - 1) = g(x)$
 $g(x + 2) + g(x) = g(x + 1)$
Adding these two equations we get
 $g(x + 2) + g(x - 1) = 0$
 $\Rightarrow g(x + 3) + g(x) = 0$
 $\Rightarrow g(x + 4) + g(x + 1) = 0$
 $\Rightarrow g(x + 5) + g(x + 2) = 0$
 $\Rightarrow g(x + 6) + g(x + 3) = 0 \Rightarrow g(x + 6) - g(x) = 0$
28. 4 There are two equations to be formed $40m + 50f = 1000$
 $250m + 300f + 40 \times 15m + 50 \times 10 \times f = A$
 $850m + 8000f = A$
 m and f are the number of males and females A is amount paid by the employer.
Then the possible values of $f = 8, 9, 10, 11, 12$
If $f = 8$
 $M = 15$
If $f = 9, 10, 11$ then m will not be an integer while $f = 12$ then m will be 10.
By putting $f = 8$ and $m = 15$, $A = 18800$. When $f = 12$ and $m = 10$ then $A = 18100$
Therefore the number of males will be 10.

29. 3 Frenchmen : F_1, F_2, F_3
Englishmen: E_1, E_2, E_3
Let E_1 knows French
I round of calls:



Persons	Secrets know after I-round
F_1	F_1, F_2
F_2	F_1, F_2, F_3
F_3	F_1, F_2, F_3, F_4
E_1	F_1, F_2, F_3, E_2
E_2	$F_1, F_2, F_3, E_1, E_2, E_3$ all known
E_3	$F_1, F_2, F_3, E_1, E_2, E_3$ All know

II round calls



In the 6th call, E_1 knows all the secrets. Similarly, after 9th call, everybody know all the secrets.

30. 2 Let the rectangle has m and n tiles along its length and breadth respectively.
The number of white tiles
 $W = 2m + 2(n - 2) = 2(m + n - 2)$
And the number of Red tiles = $R = mn - 2(m + n - 2)$
Given $W = R \Rightarrow 4(m + n - 2) = mn$
 $\Rightarrow mn - 4m - 4n = -8$
 $\Rightarrow (m - 4)(n - 4) = 8$
As m & n are integers so $(m - 4)$ & $(n - 4)$ are both integers. The possibilities are $(m - 4, n - 4) \equiv (1, 8)$ or $(2, 4)$ giving, (m, n) as $(5, 12)$ or $(6, 8)$ so the edges can have 5, 12, 6 or 8 tiles. Answer is (2) only.
31. 3 In para number 2 "Each is torn ..." and then further in para 3 "Internal ..." These lines in paras 2 and 3 talk about external conflict being psychologically empty, and no psychological problems involved therein. This makes internal conflicts psychologically interesting.
32. 2 In paragraph 4, refer to line 11, "Chess may be psychologically..... rationally." According to the author, only when someone acts irrationally will that act be considered psychologically interesting and out of the given choices only option (2) qualifies, wherein adopting a defensive strategy against an aggressive opponent will be irrational. Option (3) is incorrect as the choice that the mountaineer would make would depend on external conditions and there would not be any internal conflicts as such, and the decisions that he would need to make would have to be rational.
33. 2 In the first paragraph refer to line 4- "Thus the "interests" of the players are generally in conflict." Choice (3) may also be correct but choice (2) is more appropriate as it is stated directly in the passage whereas choice (3) is an inference. Choice (1) is a consequence of applying game theory to a situation, not one of its pre-requisites, Therefore option 4 is also ruled out.
34. 3 In paragraph 4 lines 3 onwards- "The effort... genuine" According to this, in case of the detective , if the criminal remains passive, there is no conflict, whereas the scientist has to unravel the secrets of nature (which is "passive") by deduction .

35. 2 DC is the mandatory pair, which makes 3 and 4 incorrect. E is the opening statement. A concludes the argument by substantiating the argument in EBCD. Therefore, the analogy from the previous argument is being extended in 'A' (keyword – "similarly")
36. 4 From the options, it can be ascertained that 'B' is the opening statement. Also, B explains "greater interest... than", hence 'C' is the natural antecedent to 'B', wherein "a similar neglect" has been talked, about. Hence (4) is the correct option.
37. 2 After reading statement B the first question that comes to mind is what does 'it' stand for. The question is answered by statement (E) which should be the logical antecedent. This makes EB a mandatory pair and that is present only in option (2).
38. 2 Option (2) talks about a 'near' friend. There is nothing like a near friend. It should have been 'close' friend
39. 1 It should have been "I have my hands full".
40. 3 It should have been "I can't bear her being angry".
41. 2 Answer choice (4), says that the danger being talked about is 'imminent', which is not necessarily the case as per the author in the passage, whereas the fact that everyone is complacent about it, is being talked about throughout the passage, which makes option (2) correct.
42. 3 Options (1) and (4) are incorrect because these choices are too narrow . Choice (3) is mentioned directly in the passage in the last 3 paragraphs.
43. 1 This is the correct option as choice (2) is too narrow. Choice (3) is a universal truth which may not be the case. There could be a problem between 1 and 4 but 4 is ruled out because this option is one of the reasons supporting the author's argument but is not his key argument as such. Moreover, the author does not say that the crisis is imminent.
44. 4 In the 2nd paragraph, the author is being sarcastic about the fact that the new production and refining capacity will effortlessly bring demand and supply back to balance. (line 2 onwards "the accepted ...just like that") and he quotes Tommy Cooper to emphasize his sarcasm. It must be remembered that we have to consider the author's point of view, not Tommy Cooper's. Therefore option (4) is correct
45. 4 Option (1) and (3) are contrary to what Derrida says in the passage which makes them incorrect. There can be a confusion between 2 and 4. Option (2) could have been an inference if the statement had been "Language limits our interpretations of reality". But the word 'construction' is incorrect. Therefore only option (4) according to the passage, is correct.
46. 3 According to the passage, Derrida is against logocentrism and choices (1), (2) and (4) are pro logocentrism which leaves option (3) which is different from logocentrism.
47. 1 This is a fact based question. In paragraph 2, refers to line 5 "Rather, they exist ... position". Option (1) directly follows from this line.
48. 1 Answer choice (4) is contrary to what is being said. Answer choice (3) is irrelevant. There can be a confusion between 1 and 2 but it must be noted that it is not the meaning of the text which is based on binary opposites but the interpretation. This leaves us only with answer choice (1).
49. 1 Option (1) is a logical corollary to the passage. The paragraph is silent about the audience of sodoku, therefore (2) and (3) cannot be answers. Option (4) is of extreme nature and thus ruled out.
50. 2 Option (1) is extreme. (3) is not talked about in the passage 4th is not true according to the passage, making (2) correct.
51. 3 Option (2) talks about humility which is not talked about in the passage, option (3) is an extension of the concept of being a minnow.
52. 1 The passage talks about hubris of civilization and humility is a direct consequence thus ... 'humble' is correct. (2), (3) and (4) are not talked about in the passage.
53. 2 The second sentence does not use the article. It should be 'As a/the project progresses" in sentence C there should be the indefinite article 'a' before single-minded which leaves us with option (2) as the correct answer.
54. 3 Sentence B should have "making them break apart". Sentence C should have "many offending chemicals".
55. 2 B should be "rarely has ..." C should begin with 'The'.
56. 1 Option B should be "since the Enlightenment. Option C should be "in the 1820's"
57. 3 Resurrecting i.e. bring back to practice is the best choice. (1), (2) and (4) are negative options.
58. 3 Sputtering is a light popping sound of a flame which is dying out. The ideas conveyed are dim and grim so 'shining', bright and efulgent are out.
59. 4 Such a scene should be distressing to a sensitive traveler. Irritating and disgusting are negative options. 1 can be clearly ruled out.
60. 4 The one word reply conveys that it is terse. As it has no element of humour we can easily rule out – "witty".

Questions 61 to 64:**Note 61-64:**

In any department in any given year, the average ages range from 45 – 55 year.

- (1) When a 25 year old joins; the avg. dips by around 5 to 6 yrs.
 (2) When some 60 yrs old retires the avg. ages dips lesser than in (1).

Marketing Total Age

2000	$49.33 \times 3 = 148$
2001	$44 \times 4 = 176$ here one faculty joined, age 25.
2002	$45 \times 4 = 180$
2003	$46 \times 4 = 184$

OB Total Age

2000	$50.5 \times 4 = 202$
2001	$51.5 \times 4 = 200$
2002	$52.5 \times 4 = 210$
2003	$47.8 \times 5 = 239$ One faculty joined, age 25.

Finance Total Age

2000	$50.2 \times 5 = 251$
2001	$49 \times 4 = 196$ Year 2001 one faculty retired age 60.
2002	$45 \times 5 = 225$ One faculty joined age 25.
2003	$46 \times 5 = 230$

OM Total Age

2000	$45 \times 6 = 270$
2001	$43 \times 7 = 301$ One faculty joined age 25.
2002	$44 \times 7 = 308$
2003	$45 \times 7 = 315$

61. 1 Clear from the data
 62. 4 From the data of 2000: Let that person be X, on April 1, 2000 (age of Naresh) + (age of Devesh) + (age of X) = $49.33 \times 3 = 148$ yr.
 Now ages of Naresh/Devesh on 1 Apr. - 2000 = $\frac{(52y + 4m + 10d) + (49y + 4m + 10d)}{(101y + 8m + 20d)}$
 \Rightarrow the age of X on 1-Apr-2000 is $47y + 3m + 10d$
 \Rightarrow the X's age on 1st April 2005 is $(52y + 3m + 10d)$

63. 3 Read the notes in the beginning, the average age dips twice (from 2000–2001) & from (2001–2002). The dip is more when a 25 yr old joins and lesser when somebody retires.

64. 4 New faculty joined in 2001, on 1 April, 2001 his age was 25 yrs. So on April 1, 2003, his age is 28 years.

65. 1 State Productivity (Tons per hectare)

Haryana	$\frac{19.2}{3.2} = 6$
Punjab	$\frac{24}{4} = 6$
Andhra Pradesh	$\frac{112}{22.4} = 5$
Uttar Pradesh	$\frac{67.2}{16.8} = 4$

Hence, Haryana and Punjab have the highest productivity.

66. 2 Gujarat $\rightarrow \frac{24}{51} = 0.47$
 Only per capita production of rice for Haryana, Punjab, Maharashtra and Andhra Pradesh are greater than 0.47.

67. 4 As seen from the table Haryana, Gujarat, Punjab, MP, Tamil Nadu, Maharashtra, UP and AP are intensive rice producing states.

68. 1 Rahul and Yamini.
 69. 2 Gayatri, Urvashi and Zeena, cannot attend atleast more than one workshop.
 70. 2 Anshul, Bushkant, Gayatri and Urvashi cannot attend any of the workshops.

71. 4

1	16
2	15
3	14
4	13
5	12
6	11
7	10
8	9

We will have to draw two tables in the Question number 71. Winners after round two would be 1, 2, 3, 4, 5, 11, 10, 9 for 8 rounds respectively. As Lindsay is number two she will play Venus Williams in quarter final.

72. 3 Elena is at number 6, Serena is at number 8
 If they loose then table would be
 1 9
 2 7
 3 11
 4 5

Maria is number 1 she will play Number 9, i.e. Nadia Petrova

73. 1

1	32
2	31
3	30
4	29
5	28
6	27
7	26
8	25
9	24
10	23
11	22
12	21
13	20
14	19
15	18
16	17

Matches in bold letters had upsets.

Then from the table would be winners are:
 1, 31, 29, 5, 27, 7, 25, 9, 23, 11, 21, 13, 19, 15, 17
 So for next round table is

1	17
31	15
3	19
29	13
5	21
27	11
7	23
25	9

No upset in second round hence table in next round is

1	9
15	7
3	11
13	5

We are given Maria is in semi-final. As we are not sure what is the result of other games. Table is drawn as below:

Table in next round could be:-

1	5/13
7/15	3/11

Hence Anastasia will play with Maria Sharapova.

74. 3

1	8
2	7
3	6
4	5

In this case Kim Clijster will either not reach semi final or she will play Maria in semi final.
 Hence she cannot play Maria in final.

75. 1 The minimum return will be gained if the extraordinary performing stocks (double & 1.5 growth) are the ones whose expected returns are lowest (i.e. 10% & 20%). Taking the minimum value of the expected returns as 10. We have to see which of the two values of 10 and 20 multiplied by 2 and 1.5 and vice versa yields the minimum value.
 Hence comparing the minimum value between $20 \times 2 + 10 \times 1.5$ and $20 \times 1.5 + 10 \times 2$, the 2nd one is minimum. Hence the minimum average return is

$$\frac{20 \times 1.5 + 10 \times 2 + 30 + 40}{4} = 30\%$$

76. 2 If the average return is 35%, then the total return is $35 \times 4 = 140$.

The only possible arrangement of 140 being
 $40 \times 1.5 + 30 + 20 \times 2 + 10$.
 A = 20×2 (Cement or IT)
 B = 10
 C = 30
 D = $40 (1.5)$ (Steel or Auto)

From the data given in the question we see that A has to be Cement or IT.
 D is Steel or Auto.
 Hence statements (II) and (III) are correct.

77. 3 Total return is $38.75 \times 4 = 155$
 The possible arrangement is
 $20 + 10 + 30 \times 1.5 + 40 \times 2$
 Hence
 A = 20, B = 10, C = 30 (Steel or Auto)
 D = 40 (Cement or IT)
 Hence, statements (I) and (IV) are correct.
 Hence (3).

78. 2 Given C ... Cement or IT industry
 C's Return is $30 \times 2 = 60\%$
 Among the other values we see that the possible arrangements can be
 $10 \times 1.5 + 20 + 40$, $10 + 20 \times 1.5 + 40$, $40 + 20 + 40 \times 1.5$

The average returns will be in each case

$$\frac{10 \times 1.5 + 20 + 40 + 60}{4} \quad (33.75\%),$$

$$\frac{10 + 20 \times 1.5 + 40 + 60}{4} \quad (35\%),$$

$$\frac{40 + 20 + 40 \times 1.5 + 60}{4} \quad (45\%).$$

Considering 33.75% as the valid value, then B belongs to the Auto industry.
 Hence (II) and (IV) are correct.
 Hence (2)

Questions 79 to 82:

L = London, Paris = P, New York= NY, Beijing = B

In round III, one of the two cities, either London or Paris will get 38 votes and the other 37. Further:

- 1) The persons representing London, Paris, Beijing and New York can not vote as long as their own cities are in contention. In round I, New York gets eliminated and hence the representative from NY becomes eligible for voting in the II round hence increasing the total votes by 1. This means the total votes in the first round must be $83 - 1 = 82$.
- 2) After round II, the representative from Beijing votes in the III round. This should have increased the number of total votes by 1 and the total votes must have become $83 + 1 = 84$.
 We are given that the total votes in round III are 75 only. We conclude that $84 - 75 = 9$ people who voted in round I and II have become ineligible for voting in round III.

- 3) 9 people who have voted in round I and II become ineligible for voting in round III. The reason of their ineligibility is that till round I and II, they have already voted for two different cities which are not available for contention in round III. All of these 9 voters are those who voted for NY in round I and then voted for Beijing in round II.
- 4) Beijing's vote in round II is 21. This includes 9 votes from people who voted for NY in the first round. So $21 - 9 = 12$ people voted for Beijing in both round I and II.
- 5) We are given that 75% of the people who voted for Beijing in round I, voted again for Beijing in round II as well. So, 16 people must have voted for Beijing in round I.
- 6) In round I we have:
 $82 = L + P + B + NY$
 Or
 $82 = 30 + P + 16 + 12$
 Giving $P = 24$
- 7) In round II we have:
 $83 = L + 32 + 21$, giving $L = 30$
- 8) NY had 12 votes in round I. 9 of these votes went to B (see point 2, again). The rest 3 went to P.
- 9) 16 votes for B in round I. 12 of them still vote for B. The rest 4 voted for either L or P. As L has the same number of votes in both the rounds I and II. This means in round II, these 4 votes must have gone to Paris only.
- 10) The representative from NY did not vote in round I. But has voted in round II. As L has the same people voting for it (30 votes in both the rounds I and II) and we know the exact break up of B in II. This NY-representative vote must go to Paris only. Further, in order to avoid ineligibility, this NY rep must vote for Paris only in round III also.
- 11) Paris (in round II) break up is:
 $32 = 24$ (from round I, who voted for Paris)
 $+ 4$ (out of the 16, who voted for Beijing in round I)
 $+ 3$ (out of 12, who voted for NY in round I)
 $+ 1$ (NY -Rep)
- 12) Beijing gets eliminated in round II. So the rep of Beijing can vote in round III.
- 13) 12 People (out of 21) who voted for Beijing in round II are still eligible for vote in round III.
- 14) 50% of people who voted for Beijing in I (i.e. 8 People) voted for Paris in round III. These 8 People include 4 of those who voted for Paris in round II also. Therefore 4 (out of 12 who voted for Beijing in round II and are still eligible for vote in round III) people have voted for Paris in round III.
- 15) This implies that the rest 8 (out of 12 who voted for Beijing in round II and are still eligible for vote in round III) can vote for London only. This makes London's vote = $30 + 8$ or 38 in round III. Which implies that Paris got 37 votes.
- 16) The Beijing Rep who is eligible to vote in round III must have voted for Paris only.
 The following table sums up the Vote Pattern:

Round	Total Votes	London (L)	Paris(P)	Beijing (B)	New York (NY)
I	82	30	24	16	12
II	83	30	32 = (24 + 4 + 3 + 1 of NY-rep)	21 (12 + 9)	X
III	75	38 = (30 + 8)	37 = (32 + 4 + 1 of B-rep)	X	X

(The Data Shown in **Bold** was already provided in the problem. The other data is deduced from the solution.)

79. 4 Required percentage = $\frac{9}{12} \times 100 = 75\%$
80. 4 As seen from the table. Paris got 24 votes.
81. 4 Required percentage = $\frac{8}{12} \times 100 = 66.67\%$
82. 1 Based on the table IOC members from New York must have voted for Paris in round (2).

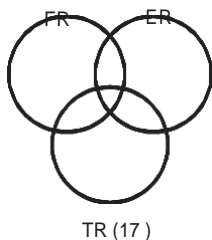
Questions 83 to 86: The given information can be shown below:

States	Firm A	Firm B	Firm C	Firm D
UP	49	82	80	55
Bihar	69	72	70	65
MP	72	63	72	65
Total	190	217	222	185

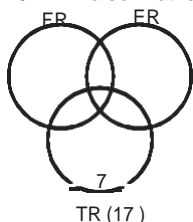
83. 2 As Truthful Ltd. has highest market share hence Truthful Ltd. can be A or C.
 From neutral statement either B and C are aggressive and honest or A and D are aggressive and honest. According to statement 1 of question 83, B is profitable, then A and D are aggressive and honest.
 Then honest total revenue cannot be more than that of profitable, hence statement 2 is false.
84. 3 According to statement 1 aggressive is (B). Then Honest Ltd. has to be C (as given in neutral statement). Then statement 2 is also true have Honest Ltd's. lowest revenue is from Bihar.
 Hence answer (3).
85. 3 B is honest according to Statement 1
 Atmost only one statement can be true as both give Aggressive and Honest as firm B.
 Firm B cannot have two names.
86. 3 Profitable can be either A or D. Then aggressive and honest has to be B and C. Hence truthful is A or D.
 And for both A and D lowest revenue is from UP.
 Hence choice (3).

Questions 87 to 90:

- 17 in TR

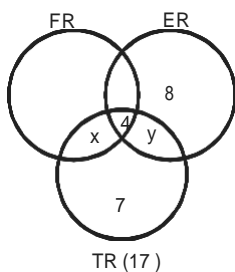


- 10 in TR also in at least one more \Rightarrow 7 in TR alone

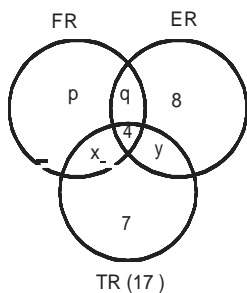


- TR alone = one less than ER alone \Rightarrow ER alone = 8

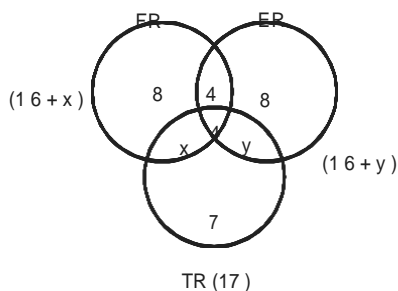
- ER alone = double of all 3 \Rightarrow In all three = $\frac{8}{2} = 4$



- FR alone = (FR and ER)

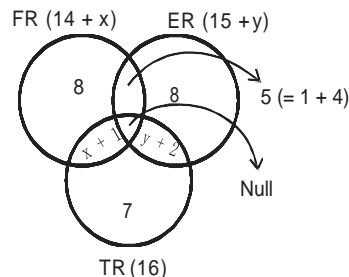


$$\begin{aligned} \Rightarrow p &= q + 4 && \dots(1) \\ \text{Total} &= 37 \\ [7 + 8 + p + (x + y + q) + 4] &= 37 && [p + q = 12] \\ \Rightarrow p - a = 4 &\Rightarrow p = 8 \text{ and } q = 4 \end{aligned}$$



Now, total number of FR is maximum
 $\Rightarrow 8 + 4 + 4 + x > 8 + 4 + 4 + y$
 $\Rightarrow x > y$ and $x + y = 6$
 as $n(\text{TR}) = 17$
 $= x + y + 4 + 7$
 $\Rightarrow x = \{4, 5, 6\}$
 $y = \{0, 1, 2\}$

87. 3 Both FR and TR but not ER = x
 Minimum x = 4
88. 1 Option (2) and option (3) are superfluous. They are not required.
 Option (1), if given, would tell us the value of x = 4 and hence y = 2.
89. 2 Out of 4 who are in all three projects, 2 move out of FR and one-one move out of ER and TR.



Minimum in FR = $14 + x = 14 + 4 = 18$
 Maximum in ER = $15 + y = 15 + 2 = 17$

$$\left\{ \begin{array}{l} \text{As} \\ x = \{4, 5, 6\} \\ y = \{0, 1, 2\} \end{array} \right.$$

Hence, option (2).

90. 4 FR and ER = 5
 ER and TR = y + 2
 $\Rightarrow 5 = y + 2$
 $\Rightarrow y = 3$;
 which is not a possible value as y is 0, 1, or 2 only.
 \Rightarrow option (4)
 Inconsistent data.