

23rd November 2003

CAT Paper

Answers and Explanations

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

Scoring table

Section	Question number	Total questions	Total attempted	Total correct	Total wrong	Net Score	Time Taken
EU + R C	1 to 50	50					
DI + DS	51 to 100	50					
QA	101 to 150	50					
Total		150					

1. The writer is using satire to mildly tease the French winemaker. (a), (c) and (d) are rather extreme choices.
2. Refer to the part *some areas ... have now produced a generation of growers using the varietal names on their labels*. The writer says that (a) is probably the only option left for French winemakers.
3. Refer to the part *it is on every wine label ... the name of the grape from which the wine is made ... acquired a basic lexicon*. (b) well describes that the French winemakers are scared of this trend.
4. Option (d) is the most substantiated reason to support Dr. Renaud's findings. The development in (d) would support Dr. Renaud's findings that fat-derived cholesterol can be dispersed by the tannins in wine.
5. (a), (b) and (d) are stated in the 4th paragraph. (c) is unlikely. A consumer may still not be enough of a connoisseur to discriminate wine tastes.
6. Refer to the part *India would resist payment, and paralyze the war effort*. (c) is clearly the answer.
7. Refer to the part *it reminded the British vividly*. (c) is clearly the answer. (a) was an outcome, not a cause. (b) is a minor factor. (d) is far-sighted.
8. (a), (c) and (d) are stated in the third paragraph. (b) is not a reason for the emergence of the 'white man's burden'. It is a consequence, not a cause.
9. Refer to the part *it was supposedly for the good of the conquered*. (a) entirely captures the meaning of the 'white man's burden'.
10. Refer to the last line of the first paragraph, the second paragraph and the last line of the passage. They amply support (d) as the answer. (a) does not touch on the financial implications. *White man's burden is a single aspect of the passage, not the main idea, so (b) is not right. (c) can be ruled out straightaway*.
11. Refer to the part *much of biotechnology research is also funded by governments*. (c) is clearly the answer.
12. Refer to the part *anti-GM campaign has been quite effective in Europe*. (c) is clearly the answer.
13. Refer to the part *use of ever-stronger herbicides which are poisonous*. The last line specifically supports (b) as the answer and not (a) which is discussed in a different context. The passage has no intention of keeping competing plants standing at all, let alone keeping them weed-free, so (c) is wrong.
14. Refer to the part *much of biotechnology research is also funded by governments in both developing and developed countries*. (d) is the answer. (a), (b) and (c) are disputed in the passage.
15. Refer to the part *GM controversy will soon hit the headlines in India ... use the potato in its midday meal program for schools*. (a) can be inferred. (b) is, of course, wrong. (c) is doubtful. (d) is also not true.
16. Refer to the part *these large gatherings*. (a) is clearly the answer.
17. Refer to the part *It is tragic ... social life which are drying up*. (c) is clearly the answer. (b) and (d) are rather extreme observations. (a) is also a blunt statement, whereas the passage does have a subtle tone.
18. Refer to the part *Interest, wonder ... the need of the first two must not be underrated*. (b) is clearly the answer.
19. *Discriminate* means to recognize *passionate attitude, distinguish* is too technical a word to fit the requirement. (b) and (d) are irrelevant.
20. The correct ans. is (d) as can be seen by the first line of the second last para. If you read the previous para also you'll find that what the author is actually saying is that the so called social life is not as per the real definitions. (a). is not right as the author is nowhere showing that the crowds in poor Calcutta can turn violent anytime. He is just giving a couple of instances to prove his point. We can't generalize like this. (b) is the opposite of what the author is trying to show. (c) again is a generalization.
21. Refer to the part *Still, an excuse of this sort can scarcely be put forward*. (a) is clearly the answer. The Greek preference for geometry is not mentioned in the passage, so (b) and (d) are out. (c) is a superficial answer.
22. Refer to the part *physical processes of nature would prove to be unfolding themselves according to rigorous mathematical laws*. (c) is clearly the answer. (a) is not true. (b) is also refuted and (d) is irrelevant.
23. Refer to the part *account be taken of his joint contributions to mathematics and physics*. (b) is clearly the answer. (a), (c) and (d) are specific aspects.
24. Refer to the part *extension of the validity*. The writer states that Einstein's special principle is an extension of the validity of the classical Newtonian principle. This being the concluding sentence makes (d) the best answer. (a) and (b) are not correct observations. (c) sounds plausible but it is actually a vague observation.
25. the correct ans is (c) If you read the 6th line of last para it's given that the principle's assertion was that "absolute velocity must ever escape all experimental detection." Which means that sometimes we can't experiment. This is very similar to (c). Ans. choice (a) is a fact and not an "implication". (b). Is again a fact and in (d). The word "meaningless" is too strong and this choice is a generalization from a specific point. Generalizations need not be correct.

26. Refer to the part *better if it lasts for years ...wealthy with all you have gained on the way*. (b) is clearly the answer. (c) is far-fetched. (a) is an isolated observation. (d) is totally incorrect.
27. Refer to the part *as many sensual perfumes as you can ... to gather stores of knowledge*. (a) is clearly the answer. (b), (c) and (d) are short-sighted observations.
28. Refer to the part *Keep Ithaka always in your mind. Arriving there is what you are destined for*. (d) is undoubtedly the answer.
29. Refer to the part *you bring them along inside your soul*. (c) is undoubtedly the answer.
30. Refer to the part *Ithaka gave you the marvelous journey, without her you would not have set out*. The poem has a tone of encouragement and promise. (b) is clearly the answer. (a), (c) and (d) are ridiculous choices.
31. *Running ... consists* has singular subject-verb agreement. Again, *more than it costs* is the right diction.
32. B and D have inappropriate temporal references. A is also wrong as *products* did not lead to the *heightened focus*. C is the answer as the second and third part of the sentence when put together is complete by itself.
33. Improper use as in falling back and explanations rule out B and C. fall back on is the right prepositional phrase and thus A is right.
34. *is regarded* should go together. *Valuable in itself* is the right expression. *Not only as ...but also as* has parallel construction. "... is regarded" should go together. "Valuable in itself" is the correct usage in relation to the subject.
35. *it would be ideal* expresses a satisfactory proposition. *Reflection* should precede *action*, and *thought* should facilitate *behavior*, though what happens in real life is exactly the opposite.
36. ADB is a clear sequence. So is CE. A has a suitable opening with *A few months ago*. The invitation and the response follow in DB. *she* in E has a clear reference in *One senior* in C.
37. CA gives the sequence of action. BD follows with reaction. The outcome is in E. CA outlines the consecutive bids. BD gives Mr. Conway's statements. *Moreover* in D adds to B.
38. C is the best beginning to the paragraph. C spells out the *misnomer*. E makes a statement on *terror* that is justified though B and in D as *Besides*. The humanitarian context of D is given in A.
39. The "these types are rare" of D should follow B. AC also is mandatory as "these cases" of C is an explanation of A. Also D looks like the logical ending and E the logical beginning. Hence the correct ans. is (a)
40. CE gives the *problem*. A gives the solution. BD gives the *Dvorak* angle. Pay attention to the openers, *To avoid this* answers the problem. Similarly, D presents a contrast with *Yet*.
41. *bundle of boy-scouts* is incorrect usage.
42. *He is clear about what is* would have been a better expression. The correct usage is "clear" about certain things.
43. *appreciated the headmaster's gesture of raising* is the correct expression, implication implies negativity.
44. *Ranchi will play host* is correct. '*Ranchi will hos*' the next national film festival is incorrect usage.
45. *Farmers of "all sorts"* is the correct expression.
46. *conceded* and *offload* are the most appropriate pair of words to fit here. *announced* do not go with *formally*, so (c) is out. Nor does *ratified*, so (d) is out. *Acquire* does not go logically with *purchasers*, so (a) is out.
47. If you have friends outside college, they tend to mask adjustment problems with college colleagues. *treatment* cannot be *compounded*, so (a) is out. If *signals* are *masked*, nothing is *facilitated*, so (b) is out. For similar reasons, *helped* in (d) cannot fill the second blank. *Identification* and *complicated* is thus the right pair.
48. In the first blank the confusion could be between "different" and "distinct". However once you know that certain regions of Spain are unique, only then can you call them distinct, not before. Which is why the first blank can't be distinct. So the first blank should be different. Now between (a) and (d) the correct answer is (a) because discrete means distinct and so we are carrying forward the thought of difference between regions and then in the regions themselves.
49. *resent* and *replacing* is the most appropriate pair of words to fit here. *welcome* cannot go with the implication in *unhappy* so (c) is out. *Resist* is too extreme to fit in a teacher's situation, so (b) is out. *are* in (d) also indicate a compulsive situation which is not evident in the sentence, so (d) is out.
50. Negative reinforcements foster negative behavior. (a), (b) and (c) are easily ruled out as *giving, bestowing or conferring* rewards cannot possibly encourage negative behaviour. *Withholding* and *fostering* thus presents the right situation here.
51. From the data both statements are false.
52. From the data both statements are false.
53. From the data statement "A" is true.
54. It is evident from graph Seeta's growth rate decreased from third month as this is the first time the slope has decreased.

55. Geeta grew at fastest rate in first two months (the slope of the line in this period is steepest for Geeta).
56. Geeta grew lowest in third month (during this period, the slope was least for Geeta).
57. Seeta increased 7cm on 50 and shyam 7cm on 53cm, Hence Shyam grew least.
58. $\frac{9}{30} \times 100 = 30\%$
59. $\frac{23}{30} \times 100 = 76.67\%$
60. $\frac{4}{30} \times 100 = 13.33\%$
61. Incase of Products, percentage of spam emails is increasing but at decreasing rate, from Sep 2002 to Dec 2002 products increased more than 100% and in Mar 2003 about 45% and in Jun 2003 10%
62. Was larger as in Dec 2002 it is a higher percentage of a higher base compared to June 2003.
63. Cannot be determined as in Sept 2002 it is a lower percentage than March 2003, however the base in Sept 2003 is higher than that in March 2002. Thus we cannot say anything.
64. It happened only once i.e; on 17-Jul-02
65. It is evident from the given data.
66. Compare and see.
67. Just draw a diagonal line from bottom left point to top right point. All companies lying above this line have profit in excess of 10% of turnover. From the graph there are 7 companies, has the profit 10% of turnover.
68. From the graph there are 2 steel companies with a turnover of more than 2000 and profit less than 300.
69. From the graph there are 5 companies.
70. By looking up the table, in University of California - Berkeley median starting salary is \$70,000 and annual tuition fee is \$18,788.
71. By looking up the table, the number of schools, uniformly better than Dartmouth College is 2.
72. By counting from the table, eight rows of first nine row schools satisfy the given condition.
73. There are 45 children of height not exceeding 135 and 48 children of age not exceeding 9 yrs. Consider the tallest child of the 45 children with height not exceeding 135. We can be very sure that his age is less than 9 yrs as taller children have higher weights. Thus all 45 children of heights not exceeding 135 will have age

not exceeding 9 yrs.

74. Using the same logic as above, there are 25 children taller than 150 cms and more than 10 years of age. There are 9 children of weights more than 38. These 9 children are surely included in the 25 children taller than 150 cms and more than 10 years of age because of the assumption given. Thus $25 - 9 = 16$ children satisfy the condition.
75. There are 55 children not exceeding 12 years but older than 6 years. Again 33 children weigh less than or equal to 38. Of these, 22 are those who are less than 6 years of age. Thus 11 of the 55 students weigh less than or equal to 38 years. So the answer is $55 - 11 = 44$.
76. Profitability is defined as percentage of sales. Approximately Firm A has 25% profit, B has 16.66%, C has 20% and D has approximately 30% profit.
77. $\frac{24568 + 25468}{89570} \times 100 = 55\%$

For questions 78 to 80:

- (+) - Male
(-) - Female

A(Lawyer)(+)-----Couple ----- D (Housewife)(-)
C (Accountant)(+)-----Couple-----F(Professor)(-)
(Or) F (Professor)(+)-----Couple-----C(Accountant)(-)

(B)(Housewife)(-)
(E)(Engineer)(+)

78. (d)
79. (a)
80. (c)

For questions 81 and 82:

If D gets portfolio F does not or vise-versa.
C wants only Home or Finance or none
If D gets Power B must get Telecom or D - Telecom then B must get Power
If A gets portfolio E should get.

81. From the above information we can infer that option (b) is correct.
82. B-Defence, D - Telecom
83. AVOCADO paint is mixture of ORANGE and PINK in equal quantities. If ORANGE is made using RED and YELLOW, then the cost of ORANGE would be $\frac{20 + 25}{2} = 22.5$ which is greater than the cost of the ORANGE. If we make PINK by RED and WHITE, the cost of PINK

would be $\frac{20+15}{2} = 17.5$ which is less than the cost of the PINK paint.

Hence, the cost of the AVOCADO is $\frac{22+17.5}{2} = 19.75$

84. Mixing equal amounts of ORANGE and WHITE can make WASHEDORANGE, ORANGE can be made by mixing equal amounts of RED and YELLOW. So the ratio of RED, YELLOW and WHITE is 1 : 1 : 2
85. If cost of AVOCADO paint is Rs.19.75
The cost of the CREAM is $[(7 \times 15) + (3 \times 75)] / 10 = \text{Rs. } 18$
And cost of WASHEDORANGE is Rs.18.50
So CREAM is the most profitable.

For questions 86 to 88:

1	2	3	4	5	6	7
C			B	D	A	G
D			B	C	A	G
D			B	C	G	A
D			B	C	A	G

86. From given options F is the only possibility.
87. If we look at the options D & G can sit together, C & F can sit together, B & D can sit together and E & A is the only option which is not possible.
88. E & G is the only possibility.
89. From statement A.
90. From both statements individually. If x is the number of tosses he took, from statement I we get the equation $10 + x - 100 = 50$. Thus $x = 140$.
From statement II individually, we have $x > 138$.
Thus we are sure he has paid up more than 148. If he incurs a loss of only Rs. 50, the game has to end normally. Thus the above state of his taking 150 shots with first 138 as tails and 139 and 140 throw as tails is the scenario. With no other scenario will a loss of just 50 and 138 tails show up.
91. Using both statements.
92. Using both statements.

For questions 93 and 94:

$G + 8 = A$
 $D + R = 37$
 $J = D + 8$
 $A = D + 5$
 $A + G = 40$

$2G = 32, G = 16, A = 24$

$D = 19, j = 27, R = 18$

93. (a)
94. $D + J = 46$

For questions 95 to 97:

Five shopping women spending various amounts with conditions

One of the women spent $2517 - 1378 = 1139$ who is Chellamma. This is the only possibility as if we add 1378 even to the least amount of 1193, we will not be able to satisfy all the conditions given simultaneously.

A	C	D	H	S
2234	1139	1193	1340	2517

95. (b)
96. (a)
97. (c)

For questions 98 to 100:

Shree Sagar restaurant and idli-vada breakfast

	Idli	Vada
Ignesh	6	6
Sandeep	1	0
Mukesh	4	2
Daljit	5	1
Bimal	8	4

98. (a)
99. (c)
100. (c)

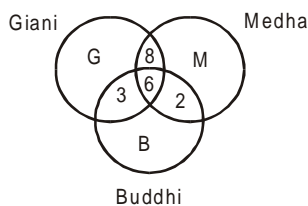
For questions 101 to 102:

S, M and R in all spend 1248 bahts.
Initially M pays 211 bahts and R pays 92 bahts.
Remaining is paid by S i.e; 945 bahts
If 1248 is divided equally among S, M & R and each has to spend 415 bahts
Hence M has to pay S 205 bahts which is 5 Dollars.
And R has to pay 324 bahts to S.

101. (d)
102. (c)
103. Putting the value of M in either equation, we get $G + B = 17$.
Hence neither of two can be uniquely determined.



104. As per the given data we get the following:



$G + B = M + 16$
 Also, $M + B + G + 19 = (2 \times 19) - 1$
 i.e. $(G + B) = 18 - M$
 Thus, $M + 16 = 18 - M$
 i.e. $M = 1$

105. $2^x - x - 1 = 0$
 $\Rightarrow 2^x - 1 = x$
 If we put $x = 0$, then this is satisfied and if we put $x = 1$, then also this is satisfied.
 Now we put $x = 2$, then this is not valid.

106. For the curves to intersect, $\log_{10} x = x^{-1}$
 Thus, $\log_{10} x = \frac{1}{x}$ or $x^x = 10$
 This is possible for only one value of x ($2 < x < 3$).

107. The surface area of a sphere is proportional to the square of the radius.

Thus, $\frac{S_B}{S_A} = \frac{4}{1}$ (S. A. of B is 300% higher than A)

$\therefore \frac{r_B}{r_A} = \frac{2}{1}$

The volume of a sphere is proportional to the cube of the radius.

Thus, $\frac{V_B}{V_A} = \frac{8}{1}$

Or, V_A is $\frac{7}{8}$ th less than B i.e. 87.5%

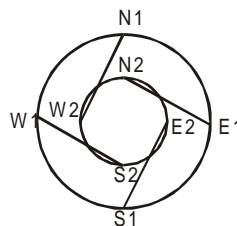
108. It is given that $p + q + r \neq 0$, if we consider the first option, and multiply the first equation by 5, second by -2 and third by -1 , we see that the coefficients of x , y and z all add up to zero.
 Thus, $5p - 2q - r = 0$
 No other option satisfies this.

109. Let 'x' be the number of standard bags and 'y' be the number of deluxe bags.
 Thus, $4x + 5y \leq 700$ and $6x + 10y \leq 1250$
 Among the choices, (c) and (d) do not satisfy the second equation.
 Choice (b) is eliminated as, in order to maximize profits the number of deluxe bags should be higher than the number of standard bags.

110. Let the 1st term be 'a' and common difference be 'd' then we have 3rd term = $a + 2d$

$15^{\text{th}} \text{ term} = a + 14d$
 $6^{\text{th}} \text{ term} = a + 5d$
 $11^{\text{th}} \text{ term} = a + 10d$
 $13^{\text{th}} \text{ term} = a + 12d$
 Since sum of 3rd and 15th term = sum of 6th, 11th and 13th term, therefore we have
 $2a + 16d = 3a + 27d$
 $\Rightarrow a + 11d = 0$
 Which is the 12th term.

For questions 111 to 113:



If the radius of the inner ring road is r , then the radius of the outer ring road will be $2r$ (since the circumference is double).
 The length of $IR = 2\pi r$, that of $OR = 4\pi r$ and that of the chord roads are $r\sqrt{5}$ (Pythagoras theorem)
 The corresponding speeds are 20π , 30π and $15\sqrt{5}$ kmph.

Thus time taken to travel one circumference of

$IR = \frac{r}{10} \text{ hr}$, one circumference of $OR = \frac{r}{7.5} \text{ hr}$.

and one length of the chord road = $\frac{r}{15} \text{ hr}$

111. Sum of the length of the chord roads = $4r\sqrt{5}$ and the length of $OR = 4\pi r$.
 Thus the required ratio = $\sqrt{5} : \pi$

112. The total time taken by the route given = $\frac{r}{30} + \frac{r}{15} = \frac{3}{2}$ (i.e. 90 min.)
 Thus, $r = 15$ km. The radius of $OR = 2r = 30$ kms

113. The total time taken = $\frac{r}{20} + \frac{r}{15} = \frac{7r}{60}$
 Since $r = 15$, total time taken = $\frac{7}{4}$ hr. = 105 min.

114. Let the number of correct answers be 'x', number of wrong answers be 'y' and number of questions not attempted be 'z'.
 Thus, $x + y + z = 50$... (i)

And $x - \frac{y}{3} - \frac{z}{6} = 32$



The second equation can be written as,
 $6x - 2y - z = 192$... (ii)
 Adding the two equations we get,

$$7x - y = 242 \text{ or } x = \frac{242}{7} + y$$

Since, x and y are both integers, y cannot be 1 or 2. The minimum value that y can have is 3.

115. The number 27 has no significance here. Statement b, will never be true for any number of people.
 Let us take the case of 2 people.
 If A knows B and B only knows A, both of them have 1 acquaintance each. Thus, B should be knowing atleast one other person.
 Let us say he knows 'C' as well. So now 'B' has two acquaintances (A and C), but C has only acquaintance (B), which is equal to that of A.
 To close this loop, C will have to know A as well. In which case he will have two acquaintances, which is the same as that of C.
 Thus the loop will never be completed unless atleast two of them have the same number of acquaintances. Besides, statements 1, 3 and 4 can be true.

NOTE: If we consider the other wise, to satisfy condition 2, the first person must have 26 acquaintances, the second 25, third 24 and so on. If we continue, the last one should have 0 acquaintance, which is not possible.

116. We can see that $x + 2$ is an increasing function and $5 - x$ is a decreasing function. This system of equation will have smallest value at the point of intersection of the two. i.e. $5 - x = x + 2$ or $x = 1.5$.
 Thus smallest value of $g(x) = 3.5$

117. **Case 1:** If $x < 2$, then $y = 2 - x + 2.5 - x + 3.6 - x = 8.1 - 3x$.
 This will be least if x is highest i.e. just less than 2. In this case y will be just more than 2.1

Case 2: If $2 \leq x < 2.5$, then $y = x - 2 + 2.5 - x + 3.6 - x = 4.1 - x$
 Again, this will be least if x is the highest case y will be just more than 1.6.

Case 3: If $2.5 \leq x < 3.6$, then $y = x - 2 + x - 2.5 + 3.6 - x = x - 0.9$
 This will be least if x is least i.e. $X = 2.5$.

Case 4: If In this case $y = 1.6$ $X \geq 3.6$, then
 $y = x - 2 + x - 2.5 + x - 3.6 = 3x - 8.1$
 The minimum value of this will be at $x = 3.6 = 27$
 Hence the minimum value of y is attained at $x = 2.5$

118. There are 101 integers in all, of which 51 are even. From 100 to 200, there are 14 multiples of 7, of which 7 are even.
 There are 11 multiples of 9, of which 6 are even. But there is one integer (i.e. 126) that is a multiple of both 7 and 9 and also even.
 Hence the answer is $(51 - 7 - 6 + 1) = 39$

119. Since the last digit in base 2, 3 and 5 is 1, the number should be such that on dividing by either 2, 3 or 5 we should get a remainder 1. The smallest such number is 31. The next set of numbers are 61, 91. Among these only 31 and 91 are a part of the answer choices.

Among these, $(31)_{10} = (11111)_2 = (1011)_3 = (111)_5$
 Thus, all three forms have leading digit 1.
 Hence the answer is 91.

120. The ratio of the speeds of the fastest and the slowest runners is 2 : 1. Hence they should meet at only one point on the circumference i.e. the starting point (As the difference in the ratio in reduced form is 1). For the two of them to meet for the first time, the faster should have completed one complete round over the slower one. Since the two of them meet for the first time after 5 min, the faster one should have completed 2 rounds (i.e. 2000 m) and the slower one should have completed 1 round. (i.e. 1000 m) in this time. Thus, the faster one would complete the race (i.e. 4000 m) in 10 min.

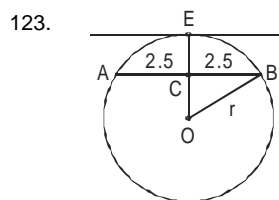
121. Solution cannot be found by using only Statement A since b can take any even number 2, 4, 6 But we can arrive at solution by using statement B alone.
 If $b > 16$, say $b = 17$
 Hence $2^{44} < (16 + 1)^{11}$
 $2^{44} < (2^4 + 1)^{11}$

122. Solution can be found using Statement A as we know

both the roots for the equation (viz. $\frac{1}{2}$ and $-\frac{1}{2}$).

Also statement B is sufficient.
 Since ratio of c and b = 1, $c = b$.

Thus the equation = $4x^2 + bx + b = 0$. Since $x = -\frac{1}{2}$ is one of the roots, substituting we get $1 - b/2 + b = 0$ or $b = -2$. Thus $c = -2$.



123. We can get the answer using the second statement only. Let the radius be r.
 $AC = CB = 2.5$ and using statement B, $CE = 5$, thus $OC = (r - 5)$.
 Using Pythagoras theorem, $(r - 5)^2 + (2.5)^2 = r^2$
 We get $r = 3.125$

NOTE: You will realize that such a circle is not possible (if $r = 3.125$ how can CE be 5). However we need to check data sufficiency and not data consistency. Since we are able to find the value of r uniquely using second statement the answer is (a).

124. Both the series are infinitely diminishing series.
 For the first series: First term = $1/a^2$ and $r = 1/a^2$
 For the second series: First term = $1/a$ and $r = 1/a^2$
 The sum of the first series = $(1/a^2) / (1 - 1/a^2)$
 $= 1 / (a^2 - 1)$
 The sum of the second series = $(1/a) / (1 - 1/a^2)$
 $= a / (a^2 - 1)$
 Now, from the first statement, the relation can be anything (depending on whether a is positive or negative).
 But the second statement tells us, $4a^2 - 4a + 1 = 0$ or
 $a = \frac{1}{2}$. For this value of a, the sum of second series will always be greater than that of the first.

125. The question tells us that the area of triangle DEF will be $1/4^{\text{th}}$ the area of triangle ABC. Thus by knowing either of the statements, we get the area of the triangle DEF.

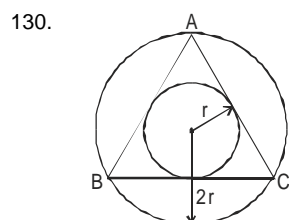
126. The number of goats remain the same.
 If the percentage that is added every time is equal to the percentage that is sold, then there should be a net decrease. The same will be the case if the percentage added is less than the percentage sold.
 The only way, the number of goats will remain the same is if $p > q$.

127. In this kind of polygon, the number of convex angles will always be exactly 4 more than the number of concave angles (why?).

NOTE : The number of vertices should be even. Hence the number of concave and convex corners should add up to an even number. This is true only for the answer choice 3.

128. The number of terms of the series forms the sum of first n natural numbers i.e.
 $n(n + 1)/2$.
 Thus the first 23 letters will account for the first $(23 \times 24) / 2 = 276$ terms of the series.
 The 288th term will be the 24th letter which is x.

129. $p + q = \alpha - 2$ and $pq = -\alpha - 1$
 $(p + q)^2 = p^2 + q^2 + 2pq$,
 Thus $(\alpha - 2)^2 = p^2 + q^2 + 2(-\alpha - 1)$
 $p^2 + q^2 = \alpha^2 - 4\alpha + 4 + 2\alpha + 2$
 $p^2 + q^2 = \alpha^2 - 2\alpha + 6$
 $p^2 + q^2 = \alpha^2 - 2\alpha + 1 + 5$
 $p^2 + q^2 = (\alpha - 1)^2 + 5$
 Thus, minimum value of $p^2 + q^2$ is 5.



Since the area of the outer circle is 4 times the area of the inner circle, the radius of the outer circle should be 2 times that of the inner circle.

Since AB and AC are the tangents to the inner circle, they should be equal. Also, BC should be a tangent to inner circle. In other words, triangle ABC should be equilateral.

The area of the outer circle is 12. Hence the area of inner circle is 3 or the radius is $\sqrt{\frac{3}{\pi}}$. The area of equilateral triangle = $3\sqrt{3} r^2$, where r is the inradius. Hence the answer is $9\sqrt{3} / \pi$

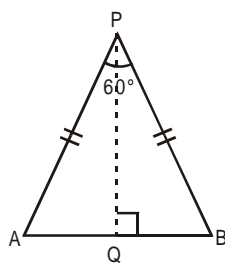
131. $(a + b + c + d)^2 = (4m + 1)^2$
 Thus, $a^2 + b^2 + c^2 + d^2 + 2(ab + ac + ad + bc + bd + cd) = 16m^2 + 8m + 1$
 $a^2 + b^2 + c^2 + d^2$ will have the minimum value if $(ab + ac + ad + bc + bd + cd)$ is the maximum.
 This is possible if $a = b = c = d = (m + 0.25)$ since
 $a + b + c + d = 4m + 1$
 In that case $2((ab + ac + ad + bc + bd + cd) = 12(m + 0.25)^2 = 12m^2 + 6m + 0.75$
 Thus, the minimum value of $a^2 + b^2 + c^2 + d^2 = (16m^2 + 8m + 1) - 2(ab + ac + ad + bc + bd + cd) = (16m^2 + 8m + 1) - (12m^2 + 6m + 0.75) = 4m^2 + 2m + 0.25$
 Since it is an integer, the actual minimum value = $4m^2 + 2m + 1$

132. If the radius of the field is r, then the total area of the field = $\pi r^2/2$.
 The radius of the semi-circles with centre's P and R = $r/2$.
 Hence, their total area = $\pi r^2/4$
 Let the radius of the circle with centre S be x.
 Thus, OS = $(r - x)$, OR = $r/2$ and RS = $(r/2 + x)$.
 Applying Pythagoras theorem, we get $(r - x)^2 + (r/2)^2 = (r/2 + x)^2$
 Solving this, we get $x = r/3$.
 Thus the area of the circle with centre S = $\pi r^2/9$.
 The total area that can be grazed = $\pi r^2(1/4 + 1/9) = 13\pi r^2/36$
 Thus the fraction of the field that can be grazed = $26/36$ (area that can be grazed / area of the field)
 The fraction that cannot be grazed = $10/36 = 28\%$ (approx.)

133. It is very clear, that a regular hexagon can be divided into six equilateral triangles. And triangle AOF is half of an equilateral triangle.
 Hence the required ratio = 1 : 12

134. If $y = 2$ (it cannot be 0 or 1), then x can take 1 value and z can take 2 values.
 Thus with $y = 2$, a total of $1 \times 2 = 2$ numbers can be formed. With $y = 3$, $2 \times 3 = 6$ numbers can be formed. Similarly checking for all values of y from 2 to 9 and adding up we get the answer as 240.

135.



Given $\angle APB = 60^\circ$ and $AB = b$.

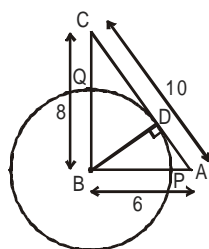
$$\therefore PQ = \frac{b}{2} \times \sqrt{3}$$

Next, $\frac{b}{2}$, h and PQ form a right angle triangle.

$$\therefore \frac{b^2}{4} + h^2 = \frac{3b^2}{4}$$

$$\therefore 2h^2 = b^2$$

136.



Triangle ABC is a right angled triangle.

$$\text{Thus } \frac{1}{2} \times BC \times AB = \frac{1}{2} \times BD \times AC$$

$$\text{Or, } 6 \times 8 = BD \times 10. \text{ Thus } BD = 4.8.$$

Therefore, $BP = BQ = 4.8$.

$$\text{So, } AP = AB - BP = 6 - 4.8 = 1.2 \text{ and } CQ = BC - BQ = 8 - 4.8 = 3.2.$$

$$\text{Thus, } AP : CQ = 1.2 : 3.2 = 3 : 8$$

137. Using the Basic Proportionality Theorem, $\frac{AB}{PQ} = \frac{BD}{QD}$

$$\text{and } \frac{PQ}{CD} = \frac{BQ}{BD}. \text{ Multiplying the two we get, } \frac{AB}{CD} = \frac{BQ}{QD} = 3 : 1.$$

$$\text{Thus } CD : PQ = BD : BQ = 4 : 3 = 1 : 0.75$$

138. Assume the number of horizontal layers in the pile be n .

$$\text{So } \sum \frac{n(n+1)}{2} = 8436$$

$$\Rightarrow \frac{1}{2} [\sum n^2 + \sum n] = 8436$$

$$\Rightarrow \frac{n(n+1)(2n+1)}{12} + \frac{n(n+1)}{4} = 8436$$

$$\Rightarrow n(n+1) \left[\frac{2n+1}{12} + \frac{1}{4} \right] = 8436$$

$$\Rightarrow \frac{n(n+1)(n+2)}{6} = 8436$$

$$\Rightarrow n(n+1)(n+2) = 36 \times 37 \times 38$$

So $n = 36$

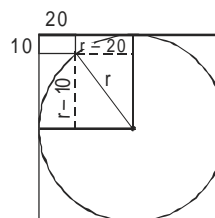
139. The best way to do this is to take some value and verify.

E.g. 2, $\frac{1}{2}$ and 1. Thus, $n = 3$ and the sum of the three numbers = 3.5. Thus options 1, 2 and 4 get eliminated.

140. Using $\log a - \log b = \log a / b$, $2 / (y - 5) = (y - 5) / (y - 3.5)$ where $y = 2^x$. Solving we get $y = 4$ or 8 i.e. $x = 2$ or 3. It cannot be 2 as log of negative number is not defined (see the second expression).

141. If $y = 10^\circ$,
 $\angle BOC = 10^\circ$ (opposite equal sides)
 $\angle OBA = 20^\circ$ (external angle of $\triangle BOC$)
 $\angle OAB = 20^\circ$ (opposite equal sides)
 $\angle AOD = 30^\circ$ (external angle of $\triangle AOC$)
 Thus $k = 3$

142.



$$\text{Let the radius be } r. \text{ Thus we have } (r - 10)^2 + (r - 20)^2 = r^2$$

$$\text{i.e. } r^2 - 60r + 500 = 0. \text{ Thus } r = 10 \text{ or } 50.$$

It would be 10, if the corner of the rectangle had been lying on the inner circumference. But as per the given diagram, the radius of the circle should be 50 cm.

143. u is always negative. Hence, for us to have a minimum value of vz/u , vz should be positive. Also for the least value, the numerator has to be the maximum positive value and the denominator has to be the smallest negative value. In other words, vz has to be 2 and u has to be -0.5 .

$$\text{Hence the minimum value of } vz / u = 2 / -0.5 = -4.$$

For us to get the maximum value, vz has to be the smallest negative value and u has to be the highest negative value. Thus, vz has to be -2 and u has to be -0.5 .

$$\text{Hence the maximum value of } vz / u = -2 / -0.5 = 4.$$

144. GRRRRR, RGRRRR, RRGRRR, RRRGRR, RRRRGR, RRRRRG
 GGRRRR, RGGRRR, RRGGRR, RRRGGR, RRRRGG
 GGGRRR, RGGGRR, RRGGRR, RRRGGG
 GGGGRR, RGGGGR, RRGGGG
 GGGGGR, RGGGGG
 GGGGGG
 Hence 21 ways.

145. When we substitute two values of x in the above curves, at x = -2 we get
 $y = -8 + 4 + 5 = 1$
 $y = 4 - 2 + 5 = 7$
 Hence at x = -2 the curves do not intersect.
 At x = 2, y = 17 and y = 11
 At x = -1, y = 5 and y = 5
 When x = 0, y = 5 and y = 5
 And at x = 1, y = 7 and y = 7
 Therefore, the two curves meet thrice when x = -1, 0 and 1.

146. Let us say there are only 3 questions. Thus there are $2^{3-1} = 4$ students who have done 1 or more questions wrongly, $2^{3-2} = 2$ students who have done 2 or more questions wrongly and $2^{3-3} = 1$ student who must have done all 3 wrongly. Thus total number of wrong answers = $4 + 2 + 1 = 7 = 2^3 - 1 = 2^n - 1$.
 In our question, the total number of wrong answers = $4095 = 2^{12} - 1$. Thus n = 12.

147. Here x, y, z are distinct positive real number

$$\text{So } \frac{x^2(y+z) + y^2(x+z) + z^2(x+y)}{xyz}$$

$$= \frac{x}{y} + \frac{x}{z} + \frac{y}{x} + \frac{y}{z} + \frac{z}{x} + \frac{z}{y}$$

$$= \left(\frac{x}{y} + \frac{y}{x}\right) + \left(\frac{y}{z} + \frac{z}{y}\right) + \left(\frac{z}{x} + \frac{x}{z}\right) \quad [\text{We know that}]$$

$$\frac{a}{b} + \frac{b}{a} > 2 \text{ if a and b are distinct numbers}$$

$$> 2 + 2 + 2$$

$$> 6$$

148. The least number of edges will be when one point is connected to each of the other 11 lines, giving a total of 11 lines. One can move from any point to any other point via the common point. The maximum edges will be when a line exists between any two points. Two points can be selected from 12 points in ${}^{12}C_2$ i.e. 66 lines.

149. From 12 to 40, there are 7 prime number, i.e. 13, 17, 19, 23, 29, 31, 37, which is not divisible by (n-1)!

150. $T_n = a + (n-1)d$
 $467 = 3 + (n-1)8$
 $n = 59$
 Half of n = 29 terms
 29th term is 227 and 30th term is 235 and when these two terms are added the sum is less than 470.
 Hence the maximum possible values the set S can have is 30.