

CAT 1996 Actual Paper

Answers and Explanations

1	a	2	a	3	a	4	b	5	c	6	a	7	a	8	a	9	c	10	b
11	b	12	b	13	b	14	c	15	d	16	a	17	b	18	a	19	a	20	c
21	b	22	a	23	d	24	b	25	a	26	b	27	c	28	b	29	b	30	a
31	a	32	b	33	c	34	a	35	c	36	c	37	a	38	b	39	a	40	a
41	d	42	d	43	a	44	a	45	c	46	c	47	a	48	a	49	a	50	d
51	b	52	b	53	d	54	b	55	a	56	c	57	b	58	c	59	d	60	a
61	a	62	c	63	d	64	b	65	a	66	c	67	b	68	c	69	c	70	b
71	a	72	d	73	d	74	a	75	b	76	d	77	a	78	a	79	c	80	d
81	a	82	c	83	b	84	d	85	c	86	b	87	b	88	c	89	d	90	c
91	b	92	c	93	a	94	b	95	c	96	b	97	d	98	d	99	a	100	b
101	c	102	b	103	c	104	d	105	b	106	b	107	a	108	a	109	a	110	b
111	a	112	a	113	c	114	c	115	d	116	b	117	c	118	c	119	b	120	b
121	b	122	a	123	c	124	b	125	a	126	b	127	b	128	d	129	d	130	b
131	d	132	d	133	c	134	a	135	a	136	c	137	d	138	b	139	b	140	b
141	c	142	d	143	a	144	c	145	b	146	b	147	a	148	d	149	d	150	b
151	a	152	d	153	c	154	d	155	b	156	b	157	a	158	b	159	d	160	c
161	d	162	b	163	b	164	c	165	a	166	a	167	d	168	d	169	d	170	b
171	c	172	d	173	c	174	d	175	b	176	a	177	a	178	d	179	d	180	a
181	c	182	a	183	d	184	a	185	b										

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
185					

1. a Starts with telling how women handle pain better than men. Given example of child birth in A followed by consequences in B, D states that men in authors' life do not take painkillers, C tells about their complaining.
2. a D States the position now, as opposed to a 'few years ago' mentioned in 1. B makes a comparison with a similar situation which A continues with. C asks a question that is answered by 6.
3. a A talks about where the wedding took place, C states who all attended marriage, D tells us about the bride and B states that little is known about her, a fact that is continued in 6.
4. b D states that in addition to being unlucky in love, Liz Taylor is unlucky in law too. C states the reason for that observation, A states the consequences of C and B states what the lawsuit was about.
5. c A tells us who Chambers was, D states why he had appeared before the Committee, C states Hiss' reaction to charges against him. B states that Nixon arranged a meeting between the two, and 6 continues with what happened at the meeting.
6. a A gives some names of the guitar heroes, C adds to the list, B states why these musicians were popular and D states why their popularity came down.
7. a A states that though oceans are the cradles of life, waste is dumped into them, C talks about the results of the same, B continues with it and D concludes that man has caused these problems.
8. a D tries to answer the question raised in 1, B simplifies the statement made in D, C further simplifies it and A talks about the position of ordinary citizens regarding the issue, which is continued in 6.
9. c B answers the question raised in 1, D gives a reason for the stand taken by the analysts regarding the new machine, C highlights that a desktop computer can come just for \$2,000 in America, and A states a disadvantage of these computers.
10. b B states Clarke's determination to make stained glass more popular, A states his success in the mission, D talks about his two projects and C elaborates on the first project while 6 talks about the second.
11. b All others have a quality of excitement in them.
12. b All others refer to a flow of a liquid.
13. b All others refer to deception in some form.
14. c All others are modes of transport.
15. d All others refer to a break in a continuous action.
16. a The first pair shows two states of matter and the second pair gives examples of those states.
17. b The first word of each pair refers to breaking up of something and the second pair refers to joining of something.
18. a Both are pairs of antonyms.
19. a Bricks put together make a building, just as words put together make a dictionary.
20. c Both are pairs of antonyms.
21. b In both the pairs, the first is interrupted or followed by the second.
22. a Using words in a wrong place is malapropism and placing something in a wrong period of time is anachronism.
23. d Anterior means front and posterior means rear.
24. b This is the only phrase that fits here.
25. a 'Even if I have tears in me' goes perfectly with 'I have to keep smiling'.
26. b Stock markets indicate public sentiment, not just confidence.
27. c 'Few will know about' is the most concise way to express the meaning.
28. b It is a well-known saying in English.
29. b 'Its haunting images' refers to the haunting images of the movie.
30. a No other choice states why they are tied to Moscow.
31. a The sentence refers to the people who are 'physically looked after' by the welfare aid. No other choice states the involvement of welfare aid.
32. b The best possible and logical answer is (b) combining realistic details.
33. c The given phrase obviously refers to the answer to the question that is bothering the author.
34. a The original phrase is best suited here.
35. c The sentence means that any other action will most probably lead to failure.
36. c If all copper is used for pins and some tin is also copper, then it follows that some pins are made of tin.
37. a If all birds lay eggs and ostrich is a bird, it follows that ostrich also lays eggs.
38. b If all wood is good and all wood is paper, it follows that some paper is also good.
39. a If all bricks are tricks and all tricks are shrieks, then some shrieks should be bricks.
40. a If all sandal is band and all band is sand, it follows that some sand is band.
41. d All life is strife and all that is wife is life, therefore all wife is also strife.
42. d All owls are mosquitoes but some owl therefore some flies are also mosquitoes.

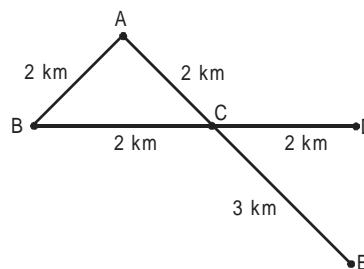
43. a Six is five but some six is twelve, therefore some twelve is also five.
44. a Although this doesn't seem convincing, but if we look at it from purely logical point of view, then if poor girls want to marry rich boys, and rich boys want to marry rich girls, then logically poor girls want to marry rich girls.
45. c D introduces Sylvester Stallone as being a successful man, B states the condition of his daughter as a contrast to his career, C states that the condition might correct itself and A states that in spite of the possible cure, how the girl might suffer.
46. c D introduces one of the twelve labours of Hercules, B states the problem involved in the task, A states how the problem could be tackled and C states how Hercules finally accomplished the task.
47. a A makes a statement that is proved by an example in D. B shows the reaction of Jodie Foster to the given fact and C continues with it.
48. a D introduces JP Morgan as one of the largest banking institutes, B states some facts to corroborate it, A tells us about how it makes its business decisions and C states the importance of JP Morgan's proprietary related data.
49. a A states an offer being made by the Saheli programme, C states that it will include all sorts of topics, B further states what the participants will learn, and D states that the tour would also include some sightseeing.
50. d A states that something magical is happening to our planet, C states what it is, B states what it is being called by some people and D states what others are calling it.
51. b The passage is about how capitalism has led to disintegration of labour.
52. b The author feels that Adam Smith boasted about something that was actually undesirable.
53. d It takes much less time to make pins by machines today.
54. b Pins are so cheap that a child stealing it would not even feel that he is actually stealing something.
55. a The author is clearly against machines taking the place of men.
56. c Adam Smith was a supporter of mass production.
57. b The statement means that as people get richer they lose out on individual abilities.
58. c He is attacking this fact by making fun of it.
59. d None of the given statements continue with what the author has said in the last paragraph.
60. a The passage refers to the British Government as the 'Empire', and talks about the way it takes over foreign territories.
61. a The author says that simple tribes are often friendly and honest.
62. c Trade of finished products falls under the capital freshly saved.
63. d He says that the civilized empire grows at the expense of the home tax payers, without any intention or approval on their parts.
64. b Civilized countries practise protection, which means there is an imposition of heavy taxes on imported goods.
65. a 'Officious' means 'self-important'.
66. c Though they seem to come with the intention of trade, soon gun boats follow and a government is set up by the capitalists in the new land.
67. b He perceives no sign of a revolution in ethical matters.
68. c The author finds no reason why the doctrines of Darwin should change our moral ideas.
69. c The Chief Good refers to the welfare of the community realized in its members.
70. b He advocates a return to a non-Christian and perhaps a Hellenic ideal.
71. a The moral code of Christianity has been rejected by all except fanatics.
72. d The passage is obviously against all the subsidies.
73. d The author believes that actually the poor pays for the subsidies and most subsidies go to the rich.
74. a Utopia is an imaginary perfect world.
75. b The author believes that subsidies do more harm than good.
76. d All are victims of subsidies.
77. a Deve Gowda's government has shown some courage when it came to petroleum prices.
78. a The passage is about the fact that ultimately subsidies are not really beneficial.
79. c Experts call inflation and not subsidies the most regressive form of taxation. Refer paragraph second line 6.
80. d They had nuclei in a less differentiated state.
81. a The contention has been proved to be true.
82. c There is prevalence of uninucleate cells.
83. b Nuclei of a binucleate cell serve as a source of hereditary information.
84. d The function of the crystalline layer has not been mentioned in the passage.
85. c A lobate form provides a much greater surface area for nuclear cytoplasmic exchanges.

86. b Fungi are multinucleate because the cross walls are either absent or irregularly present.
87. b Drug addiction has not been mentioned as a reason for poverty.
88. c Such people need extraordinary talent to become rich.
89. d Ambitious people have not been mentioned as the ones likely to get rich quickly.
90. c The author says that there is no way by which to judge the goodness or badness of a person.
91. b He rejects the notion that the wealth is distributed according to merit and feels that it is biased in favour of the rich.
92. c The author refers to someone as 'intelligent lady' implying that he is probably writing to someone.
93. a 'Imprudence' means spending too much of money.
94. b The example proves that might scores over love and religion.
95. c He has been referred to as the umpire, and the passage also mentions the assertiveness being shown by the Election Commission regarding code of conduct during the elections.
96. b The passage is about an issue-less election, as highlighted even by the last sentence of the passage.
97. d Ramakrishna Hegde's involvement in any alleged corruption case has not been mentioned in the passage.
98. d All the parties have failed to submit audited returns every year.
99. a The greater awareness among the public has not been credited with the changes coming in the system.
100. b The empowerment of women has not been mentioned as a possible issue of the elections.
101. c Amount invested on B, C, D and E in year 1
 $= 4.6 + 5.8 + 3.11 + 10.6 = 24.11$
 Amount invested on B, C, D and E in year 3
 $= 18.7 + 21.2 + 7.7 + 29.8 = 77.4$
 \therefore Percentage increase
 $= \frac{77.4 - 24.11}{24.11} \times 100 \approx 221\%$
102. b Company E's investment for years 1 to 3
 $= 10.6 + 17.4 + 29.8 = 57.8$
 Company F's investment for years 1 to 3
 $= 7.8 + 25.3 + 60.1 = 93.2$
 \therefore Ratio = 57 : 93 = 19 : 31
103. c Total investment in year 2
 $= 6.7 + 7.5 + 12.5 + 5.6 + 17.4 + 25.3 = 75$
 D's contribution in year 2 = 5.6
 \therefore Percentage contribution = $\frac{5.6}{75} = 7.4\%$
104. d As we can see from the table, none of the investments increases from year 1 to 3. Hence, none of these.

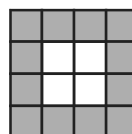
105. b In year 2,
 $A + B + C = 6.7 + 7.5 + 12.5 = 26.7$
 $D + E + F = 5.6 + 17.4 + 25.3 = 48.3$
 Percentage difference = $\frac{48.3 - 26.7}{26.7} = 80.8\% \approx 81\%$

106. b For the number to be divisible by 9, the sum of the digits should be a multiple of 9. We find that the sum of all the digits (excluding A and B) = $(7 + 7 + 4 + 9 + 5 + 8 + 9 + 6) = 55$. The next higher multiple of 9 is 63 or 72. Hence, the sum of A and B should either be 8 or 17. We find that (a) and (c) cannot be the answer. For a number to be divisible by 8, the number formed by its last three digits should be divisible by 8. The last three digits are 96B. The multiples of 8 beginning with 96 are 960 and 968. Hence, B can either be 0 or 8. Both of which satisfy our requirement of the number being divisible by 9 as well. Therefore, A and B could either be 0 and 8 or 8 and 0 respectively.
107. a If we simplify the expression $x^2 - 3x + 2 > 0$, we get $(x - 1)(x - 2) > 0$. For this product to be greater than zero, either both the factors should be greater than zero or both of them should be less than zero. Therefore, $(x - 1) > 0$ and $(x - 2) > 0$ or $(x - 1) < 0$ and $(x - 2) < 0$. Hence, $x > 1$ and $x > 2$ or $x < 1$ and $x < 2$. If we were to club the ranges, we would get either $x > 2$ or $x < 1$. So for any value of x equal to or between 1 and 2, the above equation does not follow.

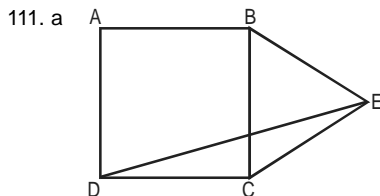
For questions 108 and 109:



108. a If there is a shop at C, all A, B, C and D are within 2 km range. Another shop is needed for E. Hence, 2 shops are required.
109. a If there is a shop at C; all A, B, D and E are within 3 km range. Hence, 1 shop is required.
110. b Since each side of the smaller cube is 3 cm, it can be figured out that each face of the original cube is divided into 4 parts, or in other words, the original cube is divided into 64 smaller cubes. For a smaller cube to have none of its sides painted, it should not be a part of the face of the original cube (i.e. none of its faces should be exposed). We can find at the centre of the original cube there are $(2 \times 2 \times 2) = 8$ such cubes.



Hint: Students please note that the answer a cube of some integer. The only cube among choices is $(2)^3 = 8$.



Since $\triangle BCE$ is an equilateral triangle, $CE = BC = BE$.
 And since $ABCD$ is a square, $BC = CD$. Hence, $CD = CE$.
 So in $\triangle CDE$, we have $CD = CE$. Hence, $\angle EDC = \angle CED$.
 Now $\angle BCE = 60^\circ$ (since equilateral triangle) and $\angle BCD = 90^\circ$ (since square).
 Hence, $\angle DCE = \angle DCB + \angle BCE = (60 + 90) = 150^\circ$.
 So in $\triangle DCE$, $\angle EDC + \angle CED = 30^\circ$ (since three angles of a triangle add up to 180°). Hence, we have $\angle DEC = \angle EDC = 15^\circ$.

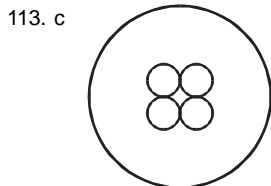
112. a Let the price per metre of cloth be Re 1. The shopkeeper buys 120 cm, but pays for only 100 cm. In other words,

he buys 120 cm for Rs. 100. So his CP = $\left(\frac{100}{120}\right)$

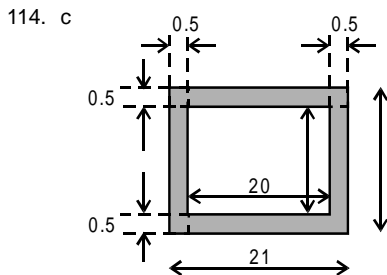
= Re 0.833 per metre. Now he sells 80 cm, but charges for 100 cm. In other words, he sells 80 cm for Rs. 100. On this he offers a 20% discount on cash payment. So he charges Rs. 80 for 80 cm cloth. In other words, his SP

= $\left(\frac{80}{80}\right)$ = Re 1 per metre. So his percentage profit in

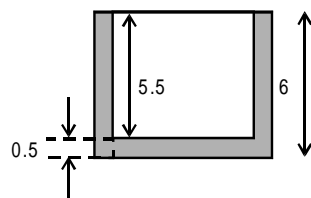
the overall transaction = $\frac{(1 - 0.833)}{0.833} = 20\%$.



Area of the original paper = $\pi(20)^2 = 400\pi \text{ cm}^2$. The total cut portion area = $4(\pi)(5)^2 = 100\pi \text{ cm}^2$. Therefore, area of the uncut (shaded) portion = $(400 - 100) = 300\pi \text{ cm}^2$. Hence, the required ratio = $300\pi : 100\pi = 3 : 1$.



When seen from top



When seen from front

As it can be seen from the diagram, because of the thickness of the wall, the dimensions of the inside of the box is as follows: length = $(21 - 0.5 - 0.5) = 20 \text{ cm}$, width = $(11 - 0.5 - 0.5) = 10 \text{ cm}$ and height = $(6 - 0.5) = 5.5 \text{ cm}$. Total number of faces to be painted = 4 walls + one base (as it is open from the top).

The dimensions of two of the walls = (10×5.5) , that of the remaining two walls = (20×5.5) and that of the base = (20×10) .

So the total area to be painted = $2 \times (10 \times 5.5) + 2 \times (20 \times 5.5) + (20 \times 10) = 530 \text{ cm}^2$.

Since the total expense of painting this area is Rs. 70,

the rate of painting = $\frac{70}{530} = 0.13 = \text{Re } 0.1 \text{ per sq.cm.}$

(approximately).

115. d $M(M(A(M(x, y), S(y, x)), x), A(y, x)) = M(M(A(M(2, 3), S(3, 2)), 2), A(3, 2)) = M(M(A((2 \times 3), (3 - 2)), 2), A(3, 2)) = M(M(A(6, 1), 2), A(3, 2)) = M(M((6 + 1), 2), (3 + 2)) = M(M(7, 2), 5) = M((7 \times 2), 5) = M(14, 5) = (14 \times 5) = 70$.

116. b $S[M(D(A(a, b), 2), D(A(a, b), 2)), M(D(S(a, b), 2), D(S(a, b), 2))] = S[M(D((a + b), 2), D((a + b), 2)), M(D((a - b), 2), D((a - b), 2))] =$

$$S\left[M\left\{\frac{(a+b)}{2}, \frac{(a+b)}{2}\right\}, M\left\{\frac{(a-b)}{2}, \frac{(a-b)}{2}\right\}\right]$$

$$= S\left[\left\{\frac{(a+b)}{2}\right\}^2, \left\{\frac{(a-b)}{2}\right\}^2\right] = \left\{\frac{(a+b)}{2}\right\}^2 - \left\{\frac{(a-b)}{2}\right\}^2$$

$$= \frac{4ab}{4} = ab$$

117. c Let the original weight of the diamond be $10x$. Hence, its original price will be $k(100x^2) \dots$ where k is a constant. The weights of the pieces after breaking are $x, 2x, 3x$ and $4x$. Therefore, their prices will be $kx^2, 4kx^2, 9kx^2$ and $16kx^2$. So the total price of the pieces = $(1 + 4 + 9 + 16)kx^2 = 30kx^2$. Hence, the difference in the price of the original diamond and its pieces = $100kx^2 - 30kx^2 = 70kx^2 = 70000$. Hence, $kx^2 = 1000$ and the original price = $100kx^2 = 100 \times 1000 = 100000 = \text{Rs. } 1 \text{ lakh}$.

118. c $n(n^2 - 1) = (n - 1)n(n + 1)$. If you observe, this is the product of three consecutive integers with middle one being an odd integer. Since there are two consecutive even numbers, one of them will be a multiple of 4 and the other one will be multiple of 2. Hence, the product will be a multiple of 8. Also since they are three consecutive integers, one of them will definitely be a multiple of 3. Hence, this product will always be divisible by $(3 \times 8) = 24$.

Hint: Students, please note if a number is divisible by 96, it will also be divisible by 48 and 24. Similarly, if a number is divisible by 48, it will always be divisible by 24. Since there cannot be more than one right answers, we can safely eliminate options (a) and (b).

119. b The radius of the circle is 6.5 cm. Therefore, its diameter = 13 cm and $AB = 13 \text{ cm}$. Since the diameter of a circle subtends 90° at the circumference, $\angle ACB = 90^\circ$. So $\triangle ACB$ is a right-angled triangle with $AC = 5, AB = 13$. Therefore, CB should be equal to 12 cm (as 5-12-13 form a Pythagorean triplet).

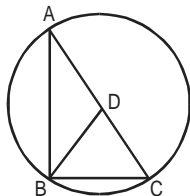
Hence, the area of the triangle = $\frac{1}{2} \times AC \times CB$
 $\times 12 = 30 \text{ sq.cm.}$

120. b Total expense incurred in making 1,500 watches = $(1500 \times 150) + 30000 = \text{Rs. } 2,55,000$.
 Total revenue obtained by selling 1,200 of them during the season = $(1200 \times 250) = \text{Rs. } 3,00,000$. The remaining 300 of them has to be sold by him during off season. The total revenue obtained by doing that = $(300 \times 100) = \text{Rs. } 30,000$. Hence, total revenue obtained = $(300000 + 30000) = \text{Rs. } 3,30,000$. Hence, total profit = $(330000 - 255000) = \text{Rs. } 75,000$.

121. b From the previous solution, we can see that the total expense incurred by him in manufacturing 1,500 watches = Rs.2,55,000. In order to break-even, he has to make a minimum revenue in order to recover his expenditure. He gets Rs. 250 per watch sold and Rs. 100 on every watch not sold. Let him sell x watches to break-even. So our equation will be $250x + 100(1500 - x) = 255000$. Solving this, we get $x = 700$ watches.

122. a Since I paid Rs. 20 and because of lack of change, the clerk gave me Rs. 3 worth of stamps, it can be concluded that the total value of the stamp that I wanted to buy is Rs. 17. Since I ordered initially a minimum of 2 stamps of each denominations, if I buy exactly 2 stamps each, my total value is $2(5 + 2 + 1) = \text{Rs. } 16$. The only way in which I make it Rs. 17 is buying one more stamp of Re 1. Hence, the total number of stamps that I ordered = $(2 + 2 + 3) = 7$. In addition, the clerk gave me 3 more. Hence, the total number of stamps that I bought = $(7 + 3) = 10$ (viz. 2 five-rupee, 2 two-rupee and 6 one-rupee stamps).

123. c



In a right-angled triangle, the length median to the hypotenuse is half the length of the hypotenuse. Hence,

$$BD = \frac{1}{2} AC = 3 \text{ cm. This relationship can be verified by}$$

knowing that the diameter of a circle subtends a right angle at the circumference e.g. in the above figure D is the centre of the circle with AC as diameter. Hence, $\angle ABC$ should be 90° . So BD should be the median to the hypotenuse. Thus, we can see that $BD = AD = CD = \text{Radius of this circle}$.

$$\text{Hence, } BD = \frac{1}{2} \text{ diameter} = \frac{1}{2} AC = \frac{1}{2} \times \text{hypotenuse.}$$

For questions 124 and 125:

Hint: Students, please note that this sum could be intelligently solved by looking at both the questions together and also the answer choices. We know that the inventory has reduced by 54 units. This means two things: (i) actual quantity sold was less than the figure that was entered the computer (i.e. after interchanging digits), so the unit's place digit of the actual quantity sold should be less than its ten's place digit; and (ii) the difference between the actual quantity sold and the one that was entered in the computer is 54. From question 125, we can figure out that the only answer choice that

supports both these conditions is (a), as $(82 - 28 = 54)$. So the actual quantity sold = 28. Now since the total sales is Rs.1,148, actual price per piece = $\frac{1148}{28} = \text{Rs.41}$. Hence, the answer to question 124 is (b).

124. b

125. a

126. b We are supposed to find out what fraction of the population has exactly one among the two (since either cable TV or VCR indicates they do not have both). Now $\frac{2}{3}$ of the people have cable TV, of whom $\frac{1}{10}$ of people also have VCR. Hence, fraction of population having

$$\text{only cable TV} = \left(\frac{2}{3} - \frac{1}{10} \right) = \frac{17}{30}. \text{ Also } \frac{1}{5} \text{ of the people}$$

have VCR, of whom $\frac{1}{10}$ of people also have cable TV.

Hence, fraction of people having only VCR =

$$\left(\frac{1}{5} - \frac{1}{10} \right) = \frac{1}{10}. \text{ The total fraction of the people who}$$

either have cable TV or VCR

$$= \left(\frac{17}{30} + \frac{1}{10} \right) = \frac{2}{3}.$$

$$127. \text{ b } \frac{1}{1 + \frac{1}{3 - \frac{4}{2 + \frac{1}{3 - \frac{1}{2}}}}} + \frac{3}{3 - \frac{4}{3 + \frac{1}{2 - \frac{1}{2}}}}$$

$$= \frac{1}{1 + \frac{1}{3 - \frac{4}{2 + \frac{1}{2}}}} + \frac{3}{3 - \frac{4}{3 + \frac{1}{2}}}$$

$$= \frac{1}{1 + \frac{1}{3 - \frac{4}{\frac{12}{5}}}} + \frac{3}{3 - \frac{4}{3 + \frac{1}{2}}}$$

$$= \frac{1}{1 + \frac{1}{3 - \frac{5}{3}}} + \frac{3}{3 - \frac{4}{\frac{3}{3}}} = \frac{1}{1 + \frac{1}{4}} + \frac{3}{3 - \frac{4}{11}}$$

$$= \frac{1}{1 + \frac{3}{4}} + \frac{3}{3 - \frac{12}{11}} = \frac{1}{1 + \frac{3}{4}} + \frac{3}{3 - \frac{12}{11}} = \frac{1}{\frac{7}{4}} + \frac{3}{\frac{21}{11}}$$

$$= \frac{4}{7} + \frac{11}{7} = \frac{15}{7}$$

128. d If we write the given equation in the conver i.e. $ax^2 + bx + c$, $a = 1$, $b = -(A - 3)$, i.e. $(3 -$

α and β . So the sum of the squares of the roots = $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$.

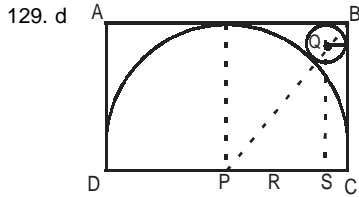
$$\text{Now } (\alpha + \beta) = \text{Sum of the roots} = \frac{-b}{a}$$

$$= \frac{(A-3)}{1} = (A-3)$$

and $\alpha\beta = \text{Product of the roots} = \frac{c}{a}$

$$= \frac{(2-A)}{1} = (2-A). \text{ Hence, } \alpha^2 + \beta^2 = (A-3)^2 - 2(2-A)$$

$$= A^2 - 4A + 5 = 0. \text{ None of the answer choices matches this.}$$



Let radius of the semicircle be R and radius of the circle be r .

Let P be the centre of semicircle and Q be the centre of the circle.

Draw QS parallel to BC .

Now, $\triangle PQS \sim \triangle PBC$

$$\therefore \frac{PQ}{PB} = \frac{QS}{BC}$$

$$\Rightarrow \frac{R+r}{\sqrt{2}R} = \frac{R-r}{R}$$

$$\Rightarrow R+r = \sqrt{2}R - \sqrt{2}r$$

$$\Rightarrow r(1+\sqrt{2}) = R(\sqrt{2}-1)$$

$$\Rightarrow r = R \frac{(\sqrt{2}-1)}{(\sqrt{2}+1)} \times \frac{(\sqrt{2}-1)}{(\sqrt{2}-1)}$$

$$\Rightarrow r = R(\sqrt{2}-1)^2$$

Required Ratio = $\frac{\pi r^2}{\pi R^2} \times 2$

$$= \frac{\pi R^2 (\sqrt{2}-1)^4 \times 2}{\pi R^2}$$

$$= 2(\sqrt{2}-1)^4 : 1$$

130. b Let us look at the two equations. Let (5 pens + 7 pencils + 4 erasers) cost Rs. x . Hence, (6 pens + 14 pencils + 8 erasers) will cost Rs. $1.5x$. Had, in the second case, Rajan decided to buy 10 pens instead of 6, the quantity of each one of them would have doubled over the first case and hence it would have cost me Rs. $2x$. So (10 pens + 14 pencils + 8 erasers) = Rs. $2x$. Now subtracting the second equation from the third, we get 4 pens cost Rs. $0.5x$. Since 4 pens cost Re $0.5x$, 5 of them will cost Re $0.625x$. This is the amount that I spent on pens. Hence, fraction of the total amount paid = $0.625 = 62.5\%$.

131. d In a mile race, Akshay can be given a start of 128 m by Bhairav. This means that Bhairav can afford to start after Akshay has travelled 128 m and still complete one mile with him. In other words, Bhairav can travel one mile, i.e. 1,600 m in the same time as Akshay can travel $(1600 - 128) = 1,472$ m. Hence, the ratio of the speeds of Bhairav and Akshay = Ratio of the distances travelled by

them in the same time = $\frac{1600}{1472} = 25 : 23$. Bhairav can give Chinmay a start of 4 miles. This means that in the time Bhairav runs 100 m, Chinmay only runs 96 m. So the ratio of the speeds of Bhairav and Chinmay = $\frac{100}{96} = 25 : 24$.

Hence, we have $B : A = 25 : 23$ and $B : C = 25 : 24$. So $A : B : C = 23 : 25 : 24$. This means that in the time Chinmay covers 24 m, Akshay only covers 23 m. In other words, Chinmay is faster than Akshay. So if they

race for $1 \frac{1}{2}$ miles = 2,400 m, Chinmay will complete the race first and by this time Akshay would only complete 2,300 m. In other words, Chinmay would beat Akshay by

$$100 \text{ m} = \frac{1}{16} \text{ mile.}$$

132. d We can solve this by alligation. But while we alligate, we have to be careful that it has to be done with respect to any one of the two liquids, viz. either A or B. We can verify that in both cases, we get the same result. e.g. the

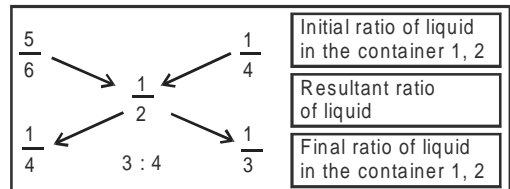
proportion of A in the first vessel is $\frac{5}{6}$ and that in the

second vessel is $\frac{1}{4}$, and we finally require $\frac{1}{2}$ parts of

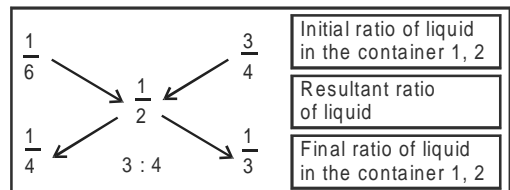
A. Similarly, the proportion of B in the first vessel is $\frac{1}{6}$,

that in the second vessel is $\frac{3}{4}$ and finally we want it to

be $\frac{1}{2}$. With respect to liquid A



With respect to liquid B



133. c Let the total distance be x . So the man travels a distance

$\frac{3x}{5}$ at a speed $3a$. Therefore, total time taken to travel

$$\text{this distance} = \frac{3x}{(15a)} = \frac{x}{(5a)}$$

$$\left[\text{time} = \frac{\text{distance}}{\text{speed}} \right]$$

He then travels a distance $\frac{2x}{5}$ at a speed $2b$. Hence,

time taken to travel this distance = $\frac{2x}{(10b)} = \frac{x}{(5b)}$. So

total time taken in going from A to B = $\frac{x}{(5a)} + \frac{x}{(5b)}$. Now

he travels from B to A and comes back. So total distance travelled = $2x$ at an average speed $5c$.

Hence, time taken to return = $\frac{2x}{(5c)}$.

Since the time taken in both the cases remains the same,

we can write $\frac{x}{5a} + \frac{x}{5b} = \frac{2x}{5c}$.

Therefore, $\frac{1}{a} + \frac{1}{b} = \frac{2}{c}$.

134. a Total time taken by the man to travel from A to D = 16 hr and total distance travelled = 36 km. The time that he would have taken had he not rested in between will be $(16 - x - 2x) = (16 - 3x)$. But this time should be equal to the addition of the times that he takes to travel individual segments. This is given as

$$\therefore \frac{12}{x} + \frac{12}{2x} + \frac{12}{4x} = \frac{84}{4x} = \frac{21}{x}. \text{ Therefore, } \frac{21}{x} = (16 - 3x).$$

So we get the equation $3x^2 - 16x + 21 = 0$. Solving

this equation, we get $x = 3$ or $x = \frac{7}{3}$. This should be the time for which he rested at B.

135. a The team has played a total of $(17 + 3) = 20$ matches.

This constitutes $\frac{2}{3}$ of the matches. Hence, total number

of matches played = 30. To win $\frac{3}{4}$ of them, a team has to

win 22.5, i.e. at least win 23 of them. In other words, the team has to win a minimum of 6 matches (since it has already won 17) out of remaining 10. So it can lose a maximum of 4 of them.

136. c This can simply be solved by multiplying the two multiplication factors to get the effective multiplication factor. e.g. multiplication factor for 30% increase = 1.30. Multiplication factor for 20% decrease = 0.8. Hence, $1.30 \times 0.8 = 1.04$. This multiplication factor (i.e. 1.04) indicates that there is a 4% increase in total revenue. So the answer is +4.

Alternative method:

By using the formula $x + y + \frac{xy}{100}$

$$\therefore x = +30\%; y = -20\%$$

$$\begin{aligned} \Rightarrow 30 + 60 + \frac{50(-20)}{100} \\ = 30 - 20 - 6 = +4\% \end{aligned}$$

137. d The three lines can be expressed as $Y = \frac{5}{3} - \frac{2X}{3}$,

$Y = \frac{5X}{7} + \frac{2}{7}$ and $Y = \frac{9X}{5} - \frac{4}{5}$. Therefore, the slopes of

the three lines are $-\frac{2}{3}$, $\frac{5}{7}$ and $\frac{9}{5}$ respectively and their

Y intercepts are $\frac{5}{3}$, $\frac{2}{7}$ and $\frac{4}{5}$ respectively. For any two

lines to be perpendicular to each other, the product of their slopes = -1 . We find that the product of none of the slopes is -1 . For any two to be parallel, their slopes should be the same. This is again not the case. And finally for the two lines to be intersecting at the same point, there should be one set of values of (X, Y) that should satisfy the equations of 3 lines. Solving the first two equations, we get $X = 1$ and $Y = 1$. If we substitute this in the third equation, we find that it also satisfies that equation. So the solution set $(1, 1)$ satisfies all three equations, suggesting that the three lines intersect at the same point, viz. $(1, 1)$. Hence, they are coincident.

138. b Out of the 5 girls, 3 girls can be invited in 5C_3 ways. Nothing is mentioned about the number of boys that he has to invite. He can invite one, two, three, four or even no boys. Each boy can be invited or not. He can invite them in 2^4 ways. Thus, the total number of ways is ${}^5C_3 \times (2)^4 = 10 \times 16 = 160$.

139. b In a watch that is running correct, the minute hand should

cross the hour hand once in every $65 + \frac{5}{11}$ min. So they should ideally cross three times once in

$$3 \times \left(\frac{720}{11} \right) = \frac{2060}{11} \text{ min} = 196.36 \text{ min. But in the watch}$$

under consideration they meet after every 3 hr, 18 min

and 15 s, i.e. $(3 \times 60 + 18 + \frac{15}{60}) = \frac{793}{4}$ min = 198.25

min. In other words, our watch is actually losing time (as it is slower than the normal watch). Hence, when our watch elapsed 198.25 min, it actually should have elapsed 196.36 min. So in a day, when our watch will elapse $(60$

$$\times 24) = 1440, \text{ it should actually elapse } \left(1440 \times \frac{196.36}{198.25} \right)$$

= 1426.27. Hence, the amount of time lost by our watch in one day = $(1440 - 1426.27) = 13.73$, i.e. 13 min and 50 s (approximately).

140. b In this case, we need not use the data that SP = Rs. 300 each. This has to be used only to figure out that the SP of both the articles is the same. Also since the profit percentage on one is equal to the loss percentage on the other, viz. 10% effectively, it will be a loss given by

$$\frac{(10)^2}{100} = 1\%. \text{ Hence, the correct answer is } (-)1.$$

Questions 141 to 145:

First series: $(S_1) = x, y, \frac{x}{2}, z, x + 20$

Second series: $(S_2) = a_1, a_2, a_3, a_4$

Now $a_1 = y - x, a_2 = \frac{x}{2} - y, a_3 = z - \frac{x}{2}$

and $a_4 = x + 20 - z$

$a_2 - a_1 = 30$ gives $3x - 4y = 60$... (i)

$a_4 - a_3 = 30$ gives $3x - 4z = 20$... (ii)

and $a_4 - a_2 = 60$ gives $x - 2z + 2y = 80$... (iii)

Solving these equations we get the values of $x = 100, y = 60, z = 70$

$\therefore S_1 = 100, 60, 50, 70, 120$

$S_2 = -40, -10, 20, 50$

141. c 142. d 143. a 144. c 145. b

Questions 146 to 150: To handle this type of questions, the best way is to express the data in tabular form.

Year	1989	1990	1991	1992	1993	1994	1995
Revenue	120	130	145	165	185	200	220
Expenditure	102	110	115	125	135	140	150
Profit	20	25	30	40	50	60	70

146. b The average revenue collected in the given 7 years
 $= \frac{(120 + 130 + 145 + 165 + 185 + 200 + 220)}{7} = 166.42$
 which is approximately is Rs. 168 lakh.

147. a Expenses of 7 years add up to 877. Revenue of 7 years add up to 1165.

Hence, the required answer is $\frac{877}{1165} \approx \frac{880}{1170} \approx 75\%$.

148. d We need to find the profit in each year.

Year	Profit percentage
1990	$(5/20) \times 100 = 25\%$
1991	$(5/25) \times 100 = 20\%$
1992	$(10/30) \times 100 = 33.33\%$
1993	$(10/40) \times 100 = 25\%$
1994	$(10/50) \times 100 = 20\%$
1995	$(10/60) \times 100 = 16.66\%$

From the above table, clearly, the answer is 1992, as in 1992 the profit is maximum, i.e. 33.33%.

149. d The growth in expenditure over the previous year can be expressed as:

Year	Growth in expenditure
1990	$(8/202) \times 100 = 7.8\%$
1991	$(5/110) \times 100 = 4.5\%$
1992	$(10/115) \times 100 = 8.7\%$
1993	$(10/125) \times 100 = 8\%$
1994	$(5/135) \times 100 = 3.7\%$
1995	$(10/140) \times 100 = 7.14\%$

Hence, it is maximum for 1992.

150. b Profit in 1994 = 60. Profit in 1995 = 70. Growth percentage

in profit in 1995 over 1994 = $\left(\frac{10}{60}\right) \times 100 = 16.66\%$.

Profit in 1996 will be $(16.66\% \text{ of } 70) + 70 = \text{Rs. } 82 \text{ lakh.}$

151. a Lipton production is 1.64 (in '000 tonnes) which corresponds to 64.8% capacity. Maximum capacity will be 100%. For 64.8% it is 1.64 \therefore For 100% it will be

$\left(\frac{100}{64.8}\right) \times 1.64 \approx \frac{100}{65} \times 1.64 \approx 2.53$ (in '000 tonnes).

152. d This can be represented in the following manner.

	Production ('000 tonnes)	Capacity utilisation (%)	Total capacity (100%)	Unutilised capacity
	A	sB	C = A/B \times 100	C - A
Brooke Bond	2.97	76.50	3.88	0.912
Nestle	2.48	71.20	3.48	1.003
Lipton	1.64	64.80	2.53	0.89
MAC	1.54	59.35	2.59	1.05

Hence, we find that the maximum unutilised capacity is for MAC, viz. 1,050 tonnes.

153. c $61.3\% \approx 11.6$

$\therefore 100\% \approx \left(\frac{100}{61.3}\right) \times 11.6 \approx \left(\frac{100}{62}\right) \times 11.6 \approx 18.7$
 ≈ 18.7 tonnes (in '000)

154. d From the data that is given, we cannot say anything about the price of coffee for the companies among others.

155. b Total sales of all brands
 $= (31.15 + 26.75 + 15.25 + 17.45) = \text{Rs. } 90.6 \text{ crore}$
 Total sales value of others = $132.8 - 90.6 = \text{Rs. } 42.2 \text{ crore}$

Required percentage = $\frac{42.2}{132.8} \times 100 \approx 31.8 \approx 32\%$.

156. b Originally for the fifth month, 4 people were scheduled to do coding. This would have cost them $(10000 \times 4) = \text{Rs. } 40,000$. Now there are 5 people who are working on design in the fifth month. The total cost for this would be $(20000 \times 5) = \text{Rs. } 1,00,000$. Hence, percentage change in the cost incurred in the fifth month = $\frac{(100000 - 40000)}{40000} \times 100 = 150\%$.

157. a As given in the previous question, it can be seen that the coding stage is now completed in 6th, 7th and 8th months. Number of people employed in the 6th month is 4 and in the 8th month is 5. In the 7th month also there are 5 people employed (from previous data). Hence, if we were to combine these months, we find that the total cost incurred in the coding stage = $(5 + 5 + 4) \times 10000 = \text{Rs. } 1,40,000$.

158. b The difference in the cost will arise only because of the following months: 5, 6 and 8. And we can compare the costs as given below

	Original scheme			New scheme		
Month	People	Cost per man/month	Total cost for the month	People	Cost per man/month	Total cost for the month
5	4	10000	40000	5	20000	1,00,000
6	5	10000	50000	4	10000	40,000
8	4	10000	40000	5	10000	50,000
	Total cost		Rs. 1,30,000	Total cost		Rs. 1,90,000

It can be clearly seen that the difference in the cost between the old and the new technique is Rs. 60,000.

159. d The cost incurred in various stages under the present scheme is as given below.

	Month	People	Cost per man/month	Total cost for the month	Total cost for the stage
Specification	1	2	40000	80000	Rs. 2,00,000
	2	3	40000	120000	
Design	3	4	20000	80000	Rs. 2,40,000
	4	3	20000	60000	
	5	5	20000	100000	
Coding	6	4	10000	40000	Rs. 1,40,000
	7	5	10000	50000	
	8	5	10000	50000	
Testing	9	4	15000	60000	Rs. 75,000
	10	1	15000	15000	
Maintenance	11	3	10000	30000	Rs. 90,000
	12	3	10000	30000	
	13	1	10000	10000	
	14	1	10000	10000	
	15	1	10000	10000	

Hence, the most expensive stage is Design.

160. c If we look at the above table again, it is clear that the average cost for 5 consecutive month period is lowest for months 11 to 15.
161. d Total investment in the two districts in 1995 = 2932.1 + 7081.6 \approx 10,000.
Total investment in the two districts in 1996 = 3489.5 + 8352 \approx 11840.
Required percentage = $\frac{(11840 - 10000)}{10000} \approx 18\%$.
162. b Total investment in electricity and thermal energy in both the districts in 1995 = (815.2 + 632.4 + 2065.8 + 1232.7) = 4746.1. Total investment made in that year = 2923.1 + 7081.6 = 10004.7 \approx 10000
Hence, required percentage is $\frac{4746.1}{10,000} \approx 47\%$.
163. b Percentage increase in investment in electricity $\approx \frac{300}{2070} = 14\%$. Percentage increase in investment in chemical $\approx \frac{(986.4 - 745.3)}{745.31} \times 100 \approx \frac{240}{745} \approx 32\%$.
Percentage increase in investment in solar = $\frac{428.6}{1792.1} \approx \frac{430}{1792} \approx 23\%$
Percentage increase in investment in nuclear = $\frac{507.8}{1674.3} \approx \frac{500}{1670} \approx 29\%$. Clearly percentage increase in investment in chemical is the highest.
164. c Total investment in Chittoor = 2923.1 + 3489.5 = 6412.6 \approx 6410. Total investment in Khammam = 7081.6 + 8352 \approx 15430. Required ratio = $\left(\frac{15430}{6410}\right) = 2.4$. times.
165. a Percentage increase in the total investment in Khammam in 1996 = $\left(\frac{(8352 - 7081.6)}{7081.6}\right) \times 100 \approx \frac{1270}{7080} \approx 18\%$
Total investment in Khammam in 1997 will be $1.18 \times 8352 = 9855.36 \approx 9850$
166. a By observation gap between the Cost and the Sales is the highest in September. Thus, the highest profit is recorded in September.
167. d By observation difference between the Cost in March and May is the highest. Thus, in May total increase in Cost is the highest as compared to two months ago.
168. d By observation difference between the Cost in March and May is the highest. Also, the Sales in March is less as compared to the following months. Thus, in May percentage increase in sales two months before the highest.
169. d By observation increase in the number of employees from January to March is the less than the increase in

profit from January to March. Thus, profit per employee is the highest in March.

170. b From January to November the number of employees that company takes = (16 - 11) \times 1000 = 5000.

171. c

Year	Number of students employed	Number of students employed from finance	Number of students employed from marketing
1992	800	$0.22 \times 800 = 176$	$0.36 \times 800 = 288$
1993	640	$0.17 \times 650 = 110.5$	$0.48 \times 650 = 312$
1994	1100	$0.23 \times 1100 = 253$	$0.43 \times 1100 = 473$
1995	1200	$0.19 \times 1200 = 228$	$0.37 \times 1200 = 444$
1996	1000	$0.32 \times 1000 = 320$	$0.32 \times 1000 = 320$
		1087.5	1837

\therefore Difference in number of students employed from finance and marketing = 1837 - 1087.5 = 749.5 \approx 750.

172. d Percentage increase in the average salary of finance = $\frac{9810 - 5450}{5450} \times 100 = 80\%$
173. c Average annual rate at which the initial salary offered in software increases = $\frac{1}{4} \left[\frac{(8640 - 5290)}{5290} \times 100 \right] = 15.83\% \approx 15.9\%$
174. d As we don't have any information about the average monthly salary offered to 'Others', we cannot determine the answer.
175. b
- | Year | Number of candidates employed from finance | Number of candidates employed from software |
|------|--|---|
| 1994 | $0.23 \times 1100 = 253$ | $0.21 \times 110 = 231$ |
- Students seeking jobs in finance earned = 253 \times 7550 = Rs. 16,28,550
Difference in the amount earned = 1910150 - 1628550 = Rs. 2.81 lakh per month = Rs. 33.8 lakh per annum.
176. a None of the statements is useful in finding the radius of the rear wheel. In the question, distance travelled is given. But the number of rotations taken by it is not given.
177. a Given that containers are in equal volume, that does not mean that quantities in each container are equal in volumes. Since we do not know the quantity, we cannot find the ratio of the final mixture.

178. d This question can be answered by using the two statements.
 Given $(a - b + c) > (a + b - c)$.
 It is nothing but is $(-b + c) > (b - c)$.
 Since b is negative and c is positive,
 $\Rightarrow c > b$
 Using both statements
 $c > 0$
 $b < 0$
 $c > b$
 So always $(a - b + c) > (a + b - c)$.
179. d Using statement II
 $2\alpha\beta = \frac{c}{a} = \alpha\beta$
 $\Rightarrow \alpha = 0$ or $\beta = 0$ or α and $\beta = 0$
 Hence, cannot be answered.
180. a Both the statements are telling the same, that selling price is 75% of cost price.
 So we cannot determine the actual cost of the article.
181. c By using statement II we can determine the selling price of the article.
 Selling price = $1.25 \times 250 = 312.5$
 But by using statement I we cannot determine the selling price.
182. a The question cannot be answered until and unless number of concurrent lines are known.
183. d Both the statements are needed to answer the questions. Since in statement I all the dates are given except the time to compound the interest. That date is given in the second statement.
184. a We cannot answer the question using both the statements.
 Given that Anil's ages are prime numbers in 1998 and 1996. It is of difference 2. There are so many prime numbers with difference 2. They are (17, 19), (41, 43) . . . so on.
 So we cannot find out exact age of Sachin.
185. b Consider the statement I:
 Let number of type-1 widgets = x .
 Number of type-2 widgets = y .
 From the given question, $x + y = 20000$.
 From statement I, $1.1x + 0.94y = 20000$.
 So we can get x and y .
 From statement II, number of type-2 widgets produced
 $= \frac{1}{3} \times 20000 = 6667$.
 The question can be answered by using either of the statements alone.