Mock CAT Test – 2

Answers and Explanations

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

	Question number	Total questions	Total attempted	Total correct	Total wrong	Net Score	Time Taken
CR + DI + DS	1 to 55	55					
RC + EU	56 to 110	55					
QA	111 to 160	50					
Total		160					

1. (a) is very vague and not really supported by the passage. (b) is inappropriate, as even if we accept that money is not the most valued commodity, it does not really imply that one's capabilities are most valued. (c) adds something that is nowhere implied in the passage by saying that the value of one's capabilities cannot be estimated. (d) is the best option because if one's capabilities did not always help him out, then they could not be said to be really able to support a person.

2. (a) might be stating the truth, but it is not a flaw in the reasoning of the passage. (c) should be eliminated, as the passage is not a detailed account of the company's losses and profits. It just makes a statement about the role of the new management. (d) is wrong as though it might be true, it cannot negate the fact that the company has started making profits. (b) counts out other factors. (b) counts out other factors.

3. (a) and (d) do not take into consideration the fact that public has become more careful in selecting their representatives. Hence, these are not the perfect conclusions. (b) cannot be inferred from the passage. (c) is the best option as it takes into account all the premises mentioned in the passage.

4. (c) is irrelevant to the number of books sold. (b) and (c) do not make any reference to the fact that the number of books required is much less than the number available. In these cases, as many books could be available as are needed. (d) is the best option as it says that all the books that were available were sold last week.

5. (a) has no supporting facts in the passage. (b) cannot be inferred as we don't know what factors led to price rise of coffee beans and whether those factors are still there or not. (d) is also inappropriate as no mention of the profits of tea growers has been made in the passage. (c) is the most appropriate option as if demand for tea leaves increased, some of the surplus stocks must have been consumed, and that is why tea leaves are now in short supply.

6. (a) and (c) both support the fact that with increase in cholesterol levels, risk of heart failure increased. (b) neither supports nor contradicts the given statement. (d) clearly contradicts the statement by saying that men with higher levels of cholesterol suffered less heart failure than those with lower levels.

7. While both Jim and Kim are taller than Tom, we do not know the relation between the heights of Jim and Kim. So (a) and (c) are wrong. (b) is wrong, as we know that Kim is taller than Tom. We know that Tina is taller than Jim, who is taller than Tom. Hence, it follows that Tina is taller than Tom. Thus, (d) is the correct option.

8. (a) does not contradict the fact that women cannot look after a family as well as men can. (b) in fact strengthens the argument presented in the passage. (c) does suggest that women are known to cope with added responsibilities, but does nothing to contradict the conclusion reached in the passage. (d) states that the fact that today more poor families are headed by women is not because women are incapable of looking after a family but because the number of families supported by women has itself risen in the given period. It thus weakens the conclusion reached in the passage.

9. (a) and (b) give reasons why the government is against the use of credit cards. They thus strengthen the argument. (d) is an example of increasing use of credit cards for online transactions. (c) is the right option as if very few people use credit cards for online transactions, it cannot be said that there is reliance on credit cards for online transactions.

10. We do not know whether AOL is an Internet company. Also being a stock market darling does not mean it is profitable, (a) is correct because if shopping on the Internet is booming and consumers are spending more, it means e-commerce is not dead.

11. Three flowers: rose, tulip, daisy.

12. A not knowing the colour of his hat, means that both B and C do not have white hats. Thus the only possibilities of B and C are White, Black; or Black, White; or Black, Black respectively. If C has White, the nB would be able to gather that he should be having Black. Since B cannot know which colour hat he has, hence the only possibility is C having Black hat

13. For any value it is valid.

14. Let the man accompany Raj Kapoor for x days. $(60 - 2x) = 20 \therefore 2x = 40 \therefore x = 20$

15. It happens four times in a day — at 6 a.m., 6 p.m. and at 12 noon, 12 midnight. So in 6 days it happens for 24 times.

16. Clearly, in all the state the market share has grown over the two given periods. Hence, 100%.

17. All the states except Bihar.

18. Since individual state's market size is not known, it is not possible to calculate the total market size.

19. 2% of X = Rs. 9 crore $\Rightarrow$ X = Rs. 450 crore

20. Since business volumes are in the ratio 1 : 2, in Orissa, the business volume = Rs. 2.5 crore.
Let the market size of Orissa = X.
$\therefore$ 30% of X = 2.5
$\therefore$ X = Rs. 8.33 crore

21. Required answer
= 145 – (31 + 21 + 15 + 23 + 19 + 17) = 19

22. 19 + 12 + 17 + 31 = 79

23. 31 + 21 + 15 + 23 = 90

24. From above, we know that number of ONLY Indians = 19.
Similarly, number of ONLY MBAs
= 133 – (31 + 21 + 19 + 16 + 15 + 23) = 8.
Number of ONLY poets
= 120 – (19 + 21 + 16 + 15 + 19 + 12) = 18
Number of ONLY smokers
= 129 – (16 + 15 + 23 + 17 + 19 + 12) = 27
Required answer
= (19 + 8 + 18 + 27) + (31 + 19 + 12 + 17) + (16 + 21 + 23 + 19) + 15 = 245

25. Number having exactly two attributes
= 19 + 31 + 17 + 12 = 79
Number having exactly three attributes
= 21 + 16 + 19 + 23 = 79 $\Rightarrow$ 79 – 79 = 0

26. The growth in percentage over the 3 years
$= \frac{200-120}{120} \times 100 = 66.66\%$
Hence, the average growth rate = $\frac{66.66}{3} \Rightarrow 22.22\%$.

27. The sales has increased to $\frac{200}{120} = \frac{5}{3}$ of the sales during 1996-97 to 1999-2000. The volume increases to $\frac{4}{3}$ of the initial volume. Hence, the average price must have become $\frac{5}{4}$ of initial price, i.e. an increase of 25%.

28. Since the exchange rate in 1999-2000 is not known, we cannot identify the answer.

29. Profit = 30 crore moolah
$\left[\frac{175}{1.20} = 145.33\right]$
$\therefore$ (175 – 145 $\simeq$ Rs. 30 crore)
Hence, profit in rupee terms = $\frac{30}{1.25} \simeq$ Rs. 24 crore.

30. The value of one moolah in 1999-2000 would be $\frac{5}{4} \times \frac{4}{5}$, i.e. Re. 1. Hence, the turnover will remain same as Rs. 200 crore.

31. 37.5 + 37.5 + x + y = 125
Since x = y, each of term = 25.
Hence, the angle subtended = $\frac{25}{125} \times 360 = 72°$

32. Sales turnover = $\frac{37.5}{125} \times 2400$ crore
= Rs. 720 crore

33. $\left[\frac{C}{A}\right]_{\text{Average price}} = \left[\frac{C}{A}\right]_{(\text{In revenue})} \times \left[\frac{A}{C}\right]_{(\text{In revenue})}$
$\Rightarrow \frac{25}{37.5} \times \frac{150}{60} \Rightarrow \frac{5}{3}$

34. Initial sales of $A = \frac{150}{300} \times 2400 = 5000$
In 2000-01, sales = 5500
$\therefore$ Change in percentage
$= \frac{5500 \times 75 - 5000 \times 37.5}{5000 \times 37.5} = 120\%$

35. Average price
$= \left(\frac{25}{125}\right) \times 2400 \times \frac{360}{60} \times \frac{1}{12000}$ = 0.24 crore
= Rs. 24 lakh

36. The distance between A and B is not known, but we know the final and initial speeds of x and y for B and A respectively.
So the average speed is $\frac{20+10}{2}$ = 15 km/hr.
Hence, the distance between A and B = 150 km.

37. Suppose they meet after t hour after t = 0.
For A: Over 10 hr, reduction in speed = 10 km/hr,
i.e. gradient = $\frac{10}{10} = 1$
For B: Over 10 hr, reduction in speed = 20 km/hr,
i.e. gradient = 2.
Average speed of A for t hour
$= \frac{(20-t)+20}{2}$ km/hr
For B it is $\frac{(25-2t)+25}{2}$ km/hr
Distance covered by them is
$\left[\frac{(20-t)+20}{2}\right] \times t + \left[\frac{(25-2t)+25}{2}\right] \times t = 150$
$\therefore$ $40t - t^2 + 50t - 2t^2 = 300$
$3t^2 - 90t + 300 = 0$
$t = \frac{30 \pm 10\sqrt{5}}{2}$, so t = 4.7 hr
($\because$ t cannot be greater than 10)
Since t is not equal to any of (a), (b) and (c).

38. Average speed = $\frac{5+25}{2} \Rightarrow$ 15 km/hr.

39. From question 37, we know that they meet after t = 4.7 hr. Hence, distance from A = $\left(\frac{40-x}{2}\right) \times x$ km
= 83 km (approximately)

40. x walks at a speed of 5 km/hr for 10 hr more. Thus, P is 50 km from A. Similarly, y walks for 2.5 hr more at a speed of 2.5 km/hr. So Q is 6.25 km from B. Thus, total distance PQ = 50 + 6.25 + AB = 206.25 km.

41. 1.05 × 0.23 × 73,000 crore = Rs. 17,630 crore (approximately)

42. Sales of Yes in March 2000 = $\frac{13}{100} \times 73000 = 9490$.

17% of total number = 17629.5

$\therefore$ Total = $\frac{17629.5}{17} \times 100$

Sales of Yes in March 2001 = $\frac{11}{100} \times \frac{17629.5 \times 100}{17}$

= 11407.3

$\therefore$ Percentage growth = $\frac{11407.3 - 9490}{9490} \times 100$

= 20% approximately

43. The total domestic market in Tamil Nadu is not known.

44. Volumewise break-up is not given.

45. Required ratio

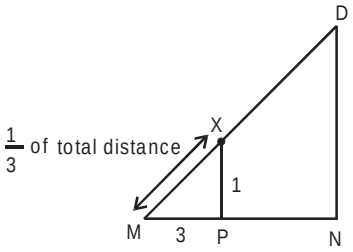
$= \frac{1}{10} \times \frac{10}{100} : \frac{1}{11} \times \frac{4}{100}$

$= \frac{1}{100} : \frac{4}{1100} = 11 : 4$

46. From the statement I, $x^3 > y^3$, so $x > y$.
From the statement II, $x^3 > -y^3$. From this, we cannot say whether $x > y$ as we do not know the signs of x and y.

47. The value of a + b can be $\pm \sqrt{a^2 + 2ab + b^2}$.

48. From statement I,



Since MX = $\sqrt{3^2 + 1^2} = \sqrt{10}$

So MD = 3 × MX

or MD = $3\sqrt{10}$

$\therefore$ Only statement I is required.
Statement II is irrelevant.

49. Statement I tells us that both a and b are positive and less than 1. Statement II says that $a > b$, $x > 0$.
Since $a > b$, $a > 0$, $b > 0$, $x > 0$, $a^x > b^x$, both statements are required.

50. We cannot say whether 'V' is an integer or not from the given information.

51. Possible values from statement I for (x, y) are:
(21, 1), (18, 2), (15, 3), (12, 4), (9, 5), (6, 6) and (3, 7).
And possible values from statement II for (x, z) are (6, 4) and (3, 10).
Combining the two statements, only possible values for (x, y, z) are (6, 6, 4) and (3, 7, 10).
In both cases, x + y + z < 24.

52. The value of x^3y^2 is either 1 or –1. In either case it is not more than 1.

53. From statement I, x = y = z = 0 since x, y and z are real.

54. Since value of V can be 0 or any other rational number.

55. From statement I, x can take either 1 or 2. And from statement II, x can have three values –1, 0 and 1. Combining I and II, x = 1.

56. To be able to survive the competition from other sources, like the basic telephony, the F-ISPs will have to enter other fields and offer more services.

57. To encourage more people to use the Internet, the author has suggested offering free domestic calls.

58. The firm has now decided not to extend its services unless the international gateway is in place.

59. F-ISPs actually use the default page of other sites to make money.

60. The players do not include the basic telephony operators, as they do not gain anything from the popularity of F-ISPs.

61. The two companies include Net Zero and AltaVista.

62. WindSpy has claimed that its service would be better than other F-ISPs as it would offer an access free of ads.

63. Caltiger, the first F-ISP in India was launched by PAPL, Kolkata.

64. All of (a) (b) and (c) are given in the passage

65. Paragraph 10 opening line gives the answer.

66. Refer paragraph 12 and paragraph 13 for the answer.

67. Refer paragraph 11 last line for the answer.

68. Refer to paragraph 1, for the answer.

69. Refer paragraph 8 last line and paragraph 14 last few lines for the answer.

70. Refer paragraph 6, 4th line for the answer.

71. Refer to paragraph 14 for the answer.

72. The discovery led to treatment of some bacterial infections para 1.

73. The medical fraternity has grown richer due to the current medical practices in America – para 6.

74. The reason is simply that medical practices differ in different countries – para 5.

75. Coronary bypass operation is beneficial in the short term – para 3.

76. Cholesterol screening applied under 'Care rather than cure' movement could be controversial as today's view of what constitutes a good diet may prove to be wrong tomorrow – last but two para.

77. The outcomes movement is likely to have only a modest effect because effectiveness of drugs is not same in all patients – para 10.

78. Biotechnologies have produced new drugs but they are very expensive – para 12.

79. It will restrict the public use of costly medicines, leaving the poor to fend for themselves – penultimate para.

80. The author claims that the evidences are conflicting and inconclusive.

81. Refer to paragraph 15 for (c).

82. Refer to paragraph 15 for (c).

83. Stated in paragraph 3 for (d).

84. Stated in paragraph 6 for (a).

85. Refer to paragraph 6, the last few lines.

86. The findings of the hospital-based study are listed in paragraphs 7 and 8. (d) is not one of these.

87. The author concludes paragraph 9 by suggesting 'data is inconclusive'. Hence (a) is best answer

88. In paragraphs 9 and 10, the author states (a) and (b).

89. I and II are stated In paragraphs 9 and 10.

90. Refer to paragraph 12 for the answer.

91. Refer to paragraph 13 for the answer.

92. In paragraph 16, the author says that the strategy for cognac will be slightly different.

93. Refer to paragraph 15 for the answer.

94. Refer to paragraph 18 for the answer.

95. (d) can be inferred from the passage, especially from the last few lines.

96. A is the introductory line with 'saving' as the subject. D and B follow sequentially as they tell more about 'savings' and 'investments' and finally 'investment growth'.

97. Starts with telling that press followed her wherever she went. C gives the type of people following her. D describes her looks and appearance as one reason for this following. B states the other reason and gives example of the type of company she kept.

98. D follows C as a logical pair.

99. C follows A as a logical pair.

100. B and A answer the question asked in opening statement. D states what the government could also do and C tells us that tax authorites still try to do it, though inconsistently.

101. A should follow the opening statement, C should follow D.

102. B states what happens in the absence of punishment. A talks about the effect of such a situation. C adds to it by using 'also' and D states what can be done instead.

103. A states that true friends are very rare, C states that as they are rare they should be respected, B states some factors which should not be considered while making friends, and D states that in business realities all the acquaintances are motivated by self-interest and thus cannot be treated as genuine friends.

104. B continues with the idea introduced in 1. A relates the idea to managers in an organization, who have to take ruthless decisions, D states how these decisions can be made easier to accept. C talks about delegation of power, an idea that is continued in 6.

105. C makes a comparison between competition and justice. D states what the choice is 'not between', and B, by using 'rather' shows that it should follow D. A continues with the idea and leads to 6.

106. Semantically only (a) is meaningful.

107. Even though signals a contrast as in (b), (c) changes voice.

108. Parallel structure 'people tend to score ... than do (tend)'.

109. (a) compliments the idea in the question part.

110. Powerful and crumble are the best and most suitable options that fit here.

111. $\frac{C(n)}{C(n-2)} = \frac{1}{4}$, since $\frac{C(n)}{C(n-1)} = A$, $\frac{C(n-1)}{C(n-2)} = A$

$\frac{C(n)}{C(n-2)} = A^2 \therefore A = \frac{1}{2}$

112. C(n) = 5%; C(0) = 80%

$\therefore C(n) = A^n (80\%) = \left(\frac{1}{2}\right)^n (80\%) = 5\% \therefore n = 4$

113. $C(3) = A^3(80\%) = \left(\frac{3}{4}\right)^3 \times 80\% = 33.75\%$

114. Ramu completes one circle every 1 s.
Shamu completes one circle every 4 s.
Hence, both of them would be at C after LCM (1, 4) = 4 s.

115. Separation of 18 m only possible when Ramu and Shamu are diammetrically opposite to each other. When Ramu gives Shamu a lead of 2 s, Shamu goes to extreme end of circle B = 12 m from C. Now in another 2 s Shamu will come to C when Ramu will cover 2 rounds and comes back to C. This goes on. So 18 m distance will not be possible.

116. $(x-1)^2 + (x-2)^2 = 2x^2 - 6x + 5$

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

So the least value of the expression is $\frac{1}{2}$.

117. Suppose side of the square is x cm.

So we have $4x = 2\sqrt{2}x + 24$.

From here, we can calculate that $x^2 = 72(3 + 2\sqrt{2})\text{cm}^2$.

118. The numbers are 5, 7, 11 and 17.
Hence sum of second and fourth number = 7 + 17 = 24

Alternative method:
Break 385 into its prime factors: 385 = 5 × 7 × 11 and also 1309 into its prime factors: 7 × 11 × 17.

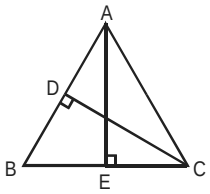
119. The largest side of the triangle is $\sqrt{a^2 + ab + b^2}$.
Suppose angle opposite to this side is θ. Then

$$\cos\theta = \frac{a^2 + b^2 - \left(\sqrt{a^2 + ab + b^2}\right)^2}{2ab} = \frac{-ab}{2ab} = -\frac{1}{2}$$

120. The unit's place can be filled in 5 ways (1, 3, 5, 7 and 9), hundred's place in 8 ways and ten's place also in 8 ways. So the number of such numbers = 8 × 8 × 5 = 320.

121. (n + 1)! = 90(n – 1)!
(n + 1)(n)(n – 1)! = 90(n – 1)!
$\Rightarrow$ n = 9

122.



$\frac{BE}{EC} = \frac{3}{4}$

CE = 7

$\therefore BE = \frac{3 \times 7}{4}$

$\therefore AB = \sqrt{AE^2 + BE^2} = \frac{3}{4}\sqrt{113}$

123. Lets assume that there are x students and each of them will contribute x paise. According to the given condition,
$x^2 = (x - 32)(x + 40) \Rightarrow 8x = 1280 \Rightarrow x = 160$

124. The required probability is $5 \times (0.8)^4 \times (0.2) + (0.8)^5$
$= 0.4096(1 + 0.8) = 0.73728$

125. Here V(x) is like e^x, so only II is right.

$\therefore \frac{e^x}{e^y} = e^{x-y}$

126. $\frac{1 + \frac{1}{9}}{\frac{1}{9} - \frac{6}{9} + \frac{9}{16}} = 160$

127. $V^m - V^n$ ends with zero means V^m and V^n both ends with same digit. That is possible only when m – n is a multiple of 4, because cyclicity of last digits of powers of 3 is 4.

128. The roots of the equation are 6 and 2 and do not form a progression.

129. Possible unsuccessful attempts = $15^3 - 1 = 3374$

$\therefore$ Time taken in opening the lock is $\frac{1}{2} \times 3374 \times 10$ s

that is more than 4 hr but less than 5 hr.

130. Any such number will end with one of (2, 3, 4, ..., 9) when 2 is in unit's place.
Number of such numbers = 1 × 2 = 2
when 3 is in unit's place.
Number of such numbers = 2 × 3 = 6
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when 9 is in unit's place.

Number of such numbers = 8 × 9 = 72
∴ Total number of such numbers
= (2 + 6 + 12 + ... + 72) = 240.

131. The number below 1000 that has maximum number of divisors is 840. Sum of digits of V = 12.

Questions 132 and 133:

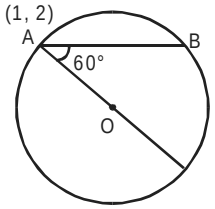
The number is 1234759680. The number has to end with zero because it is divisible by 5 as well as 2. It is divisible by 9 since 1 + 2 + 3 ... +9 is divisible by 9. Hence the expression is also divisible by 3. Already it is divisible by 2. Hence it is divisible by 6 also. So check by 7 and 8. Use the divisibility rules of 7 and 8 to get the number.

134. ccc = c × 111 = c × 3 × 37
Clearly, a = 3 and c = 7.

135. In 1! + 2! + 3! + ... + 100!, all the terms starting 11! will obviously be divisible by 11!. So when 1! + 2! + ... + 100! is divided by 11!, the remainder will be 1! + 2! + ... + 10!, (since 11! = 11 × 10! = 10! + 10! + ... up to 11 times) So remainder is a number that is much larger than first three options.

136. Put the options in the given equations, the right choice will give you a perfect square in left-hand side.
Note: Quadratic equations with equal roots are always perfect squares.

137.



Centre (2, 0) and radius $\sqrt{4+1} = \sqrt{5}$.

$\therefore$ Length of the chord = $2\sqrt{5}\cos 60° = \sqrt{5}$.

138. For the desired result, we should have both the numbers even or both the numbers odd, so the required probability is $\frac{1}{2}$.

139. Roots = $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Let $\frac{-b + \sqrt{b^2 - 4ac}}{2a} > 2$ or $\sqrt{b^2 - 4ac} > 4a + b$

or $b^2 - 4ac > 16a^2 + b^2 + 8ab$
or $4a(4a + 2b + c) < 0$

140. If we take (a), i.e. 144 and change to base 5,
i.e. $144 = 4 \times 5^0 + 4 \times 5^1 + 1 \times 5^2 = 49$

Now $\begin{array}{|c|c|c|} \hline 9 & 49 & \\ \hline 9 & 5 & 4 \\ \hline & 0 & 5 \\ \hline \end{array}$ = 54, we cannot arrive at the answer.

On taking (b), i.e. 441, we get 441
$= 1 \times 5^0 + 4 \times 5^1 + 4 \times 5^2 = 121$.

$\begin{array}{|c|c|c|} \hline 9 & 121 & \\ \hline 9 & 13 & 4 \\ \hline & 1 & 4 \\ \hline & 0 & 1 \\ \hline \end{array}$ = 144. On reversing it, we get 441.

141. For a natural number V, $V^2 + 1$ can never be divisible by 3. As squares are always in the form of 3n or (3n + 1)! hence $(V^2 + 1)$ will never be divisible by V.

142. The numbers are 34056, 34452 and 34956.

Questions 143 to 145:

Suppose speed of the raft is V km/hr and that of the boat in still water is u km/hr.
The distance between the cities is clearly 5u.

We have $\frac{5u}{u+V} + \frac{5u}{u-V} = \frac{5u}{V}$

or $\frac{1}{u+V} + \frac{1}{u-V} = \frac{1}{V}$ or $2uV = u^2 - V^2$

or $\frac{u}{V} - \frac{V}{u} - 2 = 0$ or $\frac{u}{V} = 1 + \sqrt{2}$

(u > V)
Time taken by the raft to reach Darbhanga is

$\frac{5u}{V} = 5(1+\sqrt{2})$ = 12.07 hr (approximately)

So the raft will reach Darbhanga between 9 p.m. and 10 p.m. But we cannot get the other things as we have the value of $\frac{u}{V}$ only.

Questions 146 and 147:

We have

$4(AC) = BC^2 + \frac{AB^2}{4} + 20$

or $AC = \frac{BC^2}{4} + \frac{AB^2}{16} + 5$

We know that AC $\leq$ AB + BC

or $\frac{BC^2}{4} + \frac{AB^2}{16} + 5 \leq AB + BC$

or

$\left(\frac{BC}{2}\right)^2 - 2 \times \frac{BC}{2} \times 1 + 1^2 + \left(\frac{AB}{4}\right)^2 - 2 \times \frac{AB}{4} \times 2 + 2^2 \leq 0$

or $\left(\frac{BC}{2}-1\right)^2+\left(\frac{AB}{4}-2\right)^2\le 0$

This is possible only when

$\frac{BC}{2}=1$ and $\frac{AB}{4}=2$

Hence, BC = 2 and AB = 8 km.

Area of the woods = $2^2+\frac{8^2}{4}+20=40$ km^2, and AB = 8 km.

148. Total number of outcomes = 6 × 6 × 6 = 216.
Total number of outcomes when all the numbers are distinct = 6 × 5 × 4 = 120.
∴ Total number of outcomes when not all the numbers are distinct is 216 – 120 = 96.

∴ The required probability = $\frac{96}{216}=\frac{4}{9}$.

149. Use the options.

150. If $\alpha=\omega$, then $\beta=\omega^2$

$\alpha^5+\beta^5=\omega^5+\omega^{10}=\omega^2+\omega=-1\left(\because \omega^2=1,\ 1+\omega+\omega^2=0\right)$

From (d), $-\alpha\beta=-\omega^3=-1$.

151. Suppose we take x 50-paisa coins, y 25-paisa coins and z 10-paisa coins.
We have x + y + z = 85 and 50x + 25y + 10z = 1875
∵ x, y and z are all integers, z should be a multiple of 5.

Possible values are

x	y	z
2	63	20
5	55	25
8	47	30
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23	7	55

So there are eight solutions.
You should notice here that an increase of 5 in z and 3 in x and decrease of 8 in y neither changes the number of coins nor the value.

152. Here

$\log\left\{\frac{1}{3}(a+b)\right\}=\log(ab)^{\frac{1}{2}}$

or $\frac{1}{3}(a+b)=\sqrt{ab}$

or $a^2+b^2=7ab$

153. First of all distribute 15 coins equally among 5 people, so that each of them will have 3 coins. Now you are left with 5 coins, that has to be distributed among 5 people, that can be done in

$^{5+5-1}C_{5-1}={}^9C_{5-1}=126$ ways.

Questions 154 and 155:
1, 2, 4, 7, 11, 16, 22, 29, 37, 46, 56, 67

154. Number of persons is 12.

155. And their sum = 298.

156. Since sum of the digits of the number is 55, the number is of the form 9k + 1. When $(9k+1)^{78}$ is divided by 9, the remainder is 1.

157. N will be an odd number because N is sum of one even number (2) and 13985 odd numbers.
Hence, N will not be divisible by any even number.

158. Here $729\times\left(\frac{729-a}{729}\right)^6=64$

or $\frac{729-a}{729}=\left(\frac{64}{729}\right)^{\frac{1}{6}}=\frac{2}{3}$

or a = 243

159. Use (a)
(a), i.e. Rs. 4.375.
4.375 × 10000 = Rs. 43,750
Out of Rs. 43,750, amount that will be given to 'Spice Gals' = (10000 + 20% of 43750), i.e. the remaining amount will be profit, i.e. Rs. 25,000. Hence, the charge per person should be Rs. 4.375.

160. The picture could be of young lady's father's or one of her uncle's. Hence, the data is insufficient.