

ANSWER KEY - IIFT 2009-11

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

SOLUTION IIFT - 2009-11

- 1.C Please refer to the lines "Indeed, the mystery of that ...on a new track." given in the 1st paragraph. From this it is clearly implied that he was involuntarily put on a new track. Option D is wrongly stated as there is no mention of Crespo Island and Nautilus being in its vicinity on 25th January.
- 2.B All other options are mentioned in the passage. The incident explained in option B has no reference to 25th January.
3. A Refer to the 6th paragraph where the relation between "Molluscs" and "Tentacles" has been explicitly mentioned. The relation between "Sharks" and "Snouts" has been mentioned in the seventh paragraph. The relation between "Infusoria" and "Colourless" can be established from the last four paragraphs of the passage. The relation between "coral" and "coco" is mentioned in the fourth paragraph. Hence, Option A as the correct option.
4. D Only option D can be inferred from the passage; it is mentioned in the second paragraph. The rest of the options are not true according to the passage.
5. D Option D can be inferred from the line "in the computer industry....with ever greater bandwidth" given in the 5th paragraph. Options A, B and C are not correct as per the passage.
6. D All other options are mentioned in the passage except option D. There is no reference for reduction in profit margins.
7. C Refer to the starting 2 lines in the 5th paragraph "The direct model.....keep going." Conventional manufacturing has a direct linkage with "stockpile". Only option C matches the above-mentioned relationship.
8. D Option D is false because the passage mentions that "Companies with long...meet their financial targets" whereas the option contradicts this information making it the only false statement. The rest of the options are mentioned in the passage.
9. B The passage talks about the transportation of silver from the mine to the coast on mule backs in the 2nd paragraph.
10. D Option D is clearly mentioned in the ninth paragraph where the author describes the "barracks". Rest of the options are not mentioned in the passage.
11. D The first and the second sentences of the seventh paragraph state the reasons for the Captain of the ship and the Lieutenant of the marines falling ill. The rest of the options are factually incorrect.
12. D According to the passage the name of the sergent was Drooce and not Gill. This makes option (D) the false statement.
13. * **The question is incorrect as none of the options has a word that is opposite in meaning to the given word.**
'Requiem' is a song or hymn of mourning composed or performed as a memorial to a dead person. 'Humility' is the quality or condition of being humble. 'Prerequisite' refers to something required as a prior condition. 'Resolution' means form determination and 'reign' is a period during which something or somebody is dominant or powerful. Hence, there is no correct solution to this question.
- 14.D 'Aspersions' means an abusive attack on a person's character or good name while 'Obeisance' refers to the act of obeying; dutiful or submissive behaviour with respect to another person.
15. * **The question is incorrect as none of the options has a word that is opposite in meaning to the given word.**
'Stolidity' means impassiveness. 'Posterity' refers to future or succeeding generations. 'Proximity' is closeness. 'Agility' means swiftness and 'sobriety' refers to gravity in bearing, manner, or treatment. Hence, there is no correct solution to this question.
16. D 'Chalice' refers to a bowl-shaped drinking vessel.
17. A 'Vitriolic' refers to a substance, especially a strong acid; highly corrosive.
18. B 'Acclivity' means an upward slope or grade.
19. A 'Travesty' means a debased or grotesque likeness and 'paragon' is a perfect embodiment of a concept. The two words have an antonymous relationship. The words in option (A) also have an antonymous relationship. 'Autonomy' is independence and 'subordination' refers to dependency. Hence, option (A) is correct.
20. B 'Contrite' and 'obdurate' are antonyms. 'Contrite' is sorrowful and 'obdurate' is relentless. Words in option (b) have a similar relationship. 'Aphoristic' is an adage and 'esoteric' is confined to and understandable by a small group only. Hence, (b) is correct.
21. B Both 'Peccadillo' and 'Flaw' mean "a small fault or error". Similarly, 'nick' and 'score' are synonyms. 'Nick' means a shallow notch, cut, or indentation on an edge or a surface.
22. C Just as 'Mutter' means to speak indistinctly in low tones, similarly 'articulate' means to be endowed with the power of speech i.e. well spoken.
23. A 'Malediction' means the act of calling down a curse that invokes evil. It best fits in the context. Other options are out of context.
24. B 'Prophecy' is a verb which means to deliver a sermon and 'prophecy' is a noun which means a prediction of future, made under divine inspiration. The pair fits appropriately in the context.
25. C 'Embattled' here refers to a person who is surrounded by controversy or is in conflict. Other three options are out of context.
26. D 'Trenchant' is an adjective which means distinct and 'wincing' is a verb which means to make a face indicating disgust or dislike. Other three options are out of context.
- 27.C Option (A) is incorrect because his appears to refer to the President, but the subject of the subordinate clause is the President's Administration, not the President. In option (B), it can refer to either the President's Administration or the budget reduction package. Thus, the reference is ambiguous. Option (D) adds another pronoun, its, but still retains the same flawed

reference. Option (C) corrects the flawed reference by removing all pronouns. The answer is (C).

28. C The structure of the sentence is that a noun is followed by an adjective, e.g. "war brewing" the third phrase should also follow the same structure and should be "the communication age beginning".
29. B Option A is incorrect because the verb "indicate" should be singular. Option C uses 'that' which is not required in the sentence, Option D uses perfect present tense, which makes it incorrect.
30. D Option A incorrect as the sentence cannot start with 'due to' in this case. Option B and C do not use the correct tense form in the phrase "will be delayed".
31. C Statement III is the opening statement as it is a general idea. Also, the mandatory pair is statements II and IV are the mandatory pair as 'contracted' in statement II has a link with 'this' in statement IV, The key-words 'even poorer' in statement I take the idea mentioned in statement IV forward.
32. A Statement V introduces 'Comprehensive schools' which makes it an obvious opener. "At the time" in statement I refers to 1972 mentioned in statement V, The pronoun 'he' in statement III refers to Matti Meri in statement I, the pronoun 'they' in statement IV refers to 'grammar school teachers' in statement III, which makes statements III and IV a mandatory pair, statement II carries the idea forward.
33. D Statement III introduces the idea. The pronoun 'he' in statement I refers to Dr. Nicholson mentioned in statement III. Statement IV is a continuation of what Dr. Nicholson says in statement I. Statement V gives an example of the 'specific pointer' mentioned in statement IV. The pronoun 'its' in statement II refers to 'formate' in statement V. The correct sequence is III, I, IV, V, II. Hence, option D is the correct answer.
34. D 'Disinterested' means neutral which fits in the context of statement II and IV.
35. C In statement II 'but' should not be followed by "on the contrary", as it suggests redundancy. In statement III the meaning of "on the contrary" does not fit the context. Hence, option B is the correct answer.
36. D 37. A 38. D 39. C 40. C 41. B 42. D
43. C 44. D 45. B 46. B 47. B 48. A 49. C
50. C 51. A 52. D 53. D 54. C 55. A 56. A
57. A 58. B 59. C 60. A 61. B 62. A 63. A
64. B 65. B
66. B He does not have the required marks in the entrance test, so he is not admitted.
67. D He is more than 33 years old but has 12 years of work experience. So he should be admitted under sponsored quota.
68. *A, C
From the given information, it can be drawn that the child-school combinations are:
Rahman - Leelavati , Binod - Colombus , Badal - Lancer.
Also, the child from Andhra Pradesh won the 1st prize, that from Karnataka won the 2nd and that from Maharashtra won the 3rd prize.

Since the school in Andhra Pradesh cannot be Columbus and Lancer school did not secure 1st prize, so Leelavati is in Andhra Pradesh. Hence, Rehman won the 1st prize. This negates options (B) and (D).

Since the states and the positions of Badal and Binod cannot be determined from the given information, both options (A) and (C) hold true.

69. B Number of milk packet = $2000 + 200n$, where n is a natural number.
Price per packet = Rs. $(20 - n)$
Revenue = $(2000 + 200n)(20 - n) = 40000 + 2000n - 200n^2$
Differentiating the above polynomial, we get
 $200 - 400n \dots(i)$
For maxima, equating (i) to zero, we get
 $200 - 400n = 0$
 $\Rightarrow n = 5$
 \therefore Maximum revenue will be at $(2000 + 200 \times 5)$
 $= 3000$ milk packets.
70. B Rani found only 1 rupee with her at the end.
Before 3rd security guard, she had $(1 + 2) \times 2 = \text{Rs.}6$
Before 2nd security guard, she had $(6 + 2) \times 2 = \text{Rs.}16$
Before 1st security guard, she had $(16 + 2) \times 2 = \text{Rs.}36$.

For questions 71 and 72:

Let Professor Fotedar, Professor Das, Professor Chaudhury, Professor Banik, Professor Eswar and Professor Acharya be represented by F, D, C, B, E and A respectively.

If D gets assignment, F does not or vice-versa.

C wants only HRM or Finance or none.

If D gets Psychology, B must get Trade policy; if D gets Trade policy then B must get Psychology.

If A gets assignment, E should get one too.

71. B Option (A) gets eliminated because C can have either HRM or Finance.
Option (C) gets eliminated because F and D cannot be in the same team.
Option (D) gets eliminated because C cannot have Trade policy.
Hence, (B) is the correct option.
72. D B-Development Studies, D – Trade policy because if D gets Trade policy, then B must get Psychology.

For questions 73 to 75:

Four of the amounts spent by the five women are Rs.2234, Rs.1193, Rs.1340 and Rs.2517.

Two cases arise:

(i) The lowest amount spent is Rs.1193 (by Chandrima):

Then, the fifth amount will be $\text{Rs.}(1193 + 1378) = \text{Rs.}2571$, which will then be the highest amount and is spent by Sumitra. As Aradhana arrived before Chandrima, so she must have spent Rs.2234. This implies Heena spent Rs.2517 and Deepika spent Rs.1340, which is a contradiction.

Hence, this case is not possible.

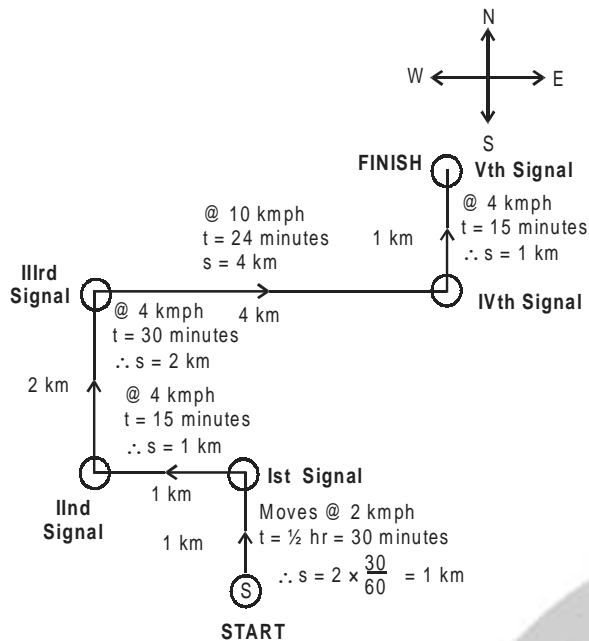
(ii) The highest amount spent is Rs.2517 (by Sumitra):

Then the fifth amount will be $\text{Rs.}(2517 - 1378) = \text{Rs.}1139$. Since it is the lowest amount, it will be spent by Chandrima. Further analysis leads to the following table:

Order of arrival	1	2	3	4	5
Name	Aradhana	Chandrima	Deepika	Heena	Sumitra
Amount spent	Rs.2234	Rs.1139	Rs.1193	Rs.1340	Rs.2517

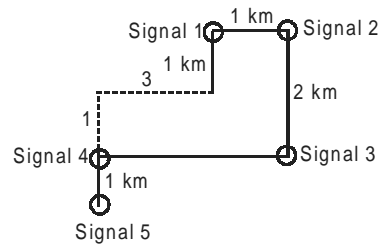
73. B 74. A 75. C

76. A



Note: s = Distance covered; v = Velocity (km/hr)
 t = Time taken; $s = v \times t$
 The total distance travelled by the motorist from the starting point till last signal is $1 + 1 + 2 + 4 + 1 = 9$ km

77. A



78. C

When heading towards North direction, the final position of Kartikey is 3.0 km to East and 4.0 km to the North (Refer to the figure in question 76).

Therefore, when heading towards South, his final position will be the mirror image of his final position when driving to North, i.e., 3.0 km to West and 5.0 km to the South.

For questions 79 to 82:

Sons – Arun (A), Mahi (M), Rohit (R), Nitesh (N), Sourav (S)

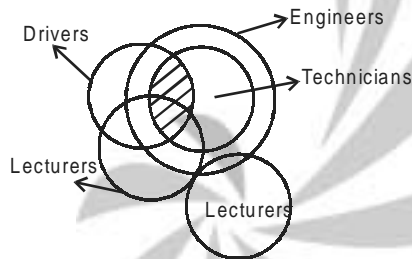
Daughters – Tamanna (T), Kuntala (K), Janaki (J)

From the given information, we can arrange the sons & daughters in descending order of their age.

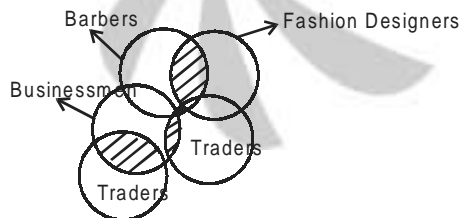
Son/Daughter	Son	Son	Son	Daughter	Daughter	Son	Son	Daughter
Name	S	M/N	N/M	K	T	A	R	J
School	Trinity	Mansrover	Mansrover	Trinity	St. Stefan	St. Stefan	St. Stefan	Trinity
Game		Cricketer	Cricketer	Chess		Football	Hockey	

79. C 80. A 81. D 82. B

83. B



84. D



85. D Pritu's father's sister's grandfather is Pritu's father's grandfather. His grandfather's only son is Pritu's father's father. His father's wife is Pritu's father's mother. His mother's daughter's daughter is Pritu's father's niece. Sushma is Pritu's sister. Hence, Sushma is Priya's Cousin.

86. A It satisfies all the conditions.

87. B The given information is not adequate as the director has passed the three years course or not, is not given.

88. D It was submitted to NFDC after 31/10/07.

For questions 89 to 92: In the given arrangement, the numbers have been arranged in the ascending order of sum of digits in a sequence and the moving out number is replaced by that number in whose place it sits in each step.

89. A Input: 655, 436, 764, 799, 977, 572, 333
 Step 1: 333, 436, 764, 799, 977, 572, 655
 Step 2: 333, 436, 572, 799, 977, 764, 655
 Step 3: 333, 436, 572, 655, 977, 764, 799

90. B Input: 544, 653, 325, 688, 461, 231, 857,
 Step 1: 231, 653, 325, 688, 461, 544, 857
 Step 2: 231, 325, 653, 688, 461, 544, 857
 Step 3: 231, 325, 461, 688, 653, 544, 857
 Step 4: 231, 325, 461, 544, 653, 688, 857
 Step 5: 231, 325, 461, 544, 653, 857, 688 (Last step)

91.D Case 1:
 Input: 666, 734, 355, 432, 433, 542, 574
 Step 1: 432, 734, 355, 666, 433, 542, 574
 Step 2: 432, 433, 355, 666, 734, 542, 574
 Step 3: 432, 433, 542, 666, 734, 355, 574

Case 2:
 Input: 666, 734, 574, 432, 433, 355, 542
 Step 1: 432, 734, 574, 666, 433, 355, 542
 Step 2: 432, 433, 574, 666, 734, 355, 542
 Step 3: 432, 433, 542, 666, 734, 355, 574

92. C Input: 653, 963, 754, 345, 364, 861, 541
 Step 1: 541, 963, 754, 345, 364, 861, 653
 Step 2: 541, 345, 754, 963, 364, 861, 653
 Step 3: 541, 345, 364, 963, 754, 861, 653

For questions 93 to 95: In this input output solution, the ultimate aim is to arrange the last letter of each word in alphabetically reverse order.

93. B When we arrange the words of the input "He is going out to search air" in a similar fashion, we get the last step as "out is air to search going he".

94. C In the sentence "not is the casino considering legal action" we see that only the starting two words are in order so it has to be either 1st step or the 2nd step. Since it is given that it is not the second step, we can conclude that it is the first step.

1 st step	not	is	the	casino	considering	legal	action
2 nd step	not	is	casino	the	considering	legal	action
3 rd step	not	is	casino	action	the	considering	legal
4 th step	not	is	casino	action	legal	the	considering

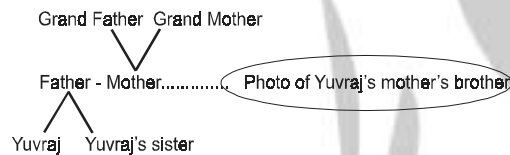
95. D

Input	Father	needs	to	check	on	the	boy
1 st step	boy	Father	needs	to	check	on	the
2 nd step	boy	needs	Father	to	check	on	the
3 rd step	boy	needs	Father	to	on	check	the

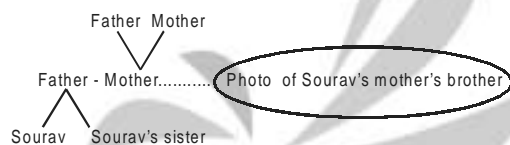
Hence, three steps are required to reach the final output.

96. D From the data given in the question, we arrive at the final sequence in the order of fattest to thinnest as Bibek, Anil, Debu, Charu and Eswar. Hence, Eswar is the thinnest of all.

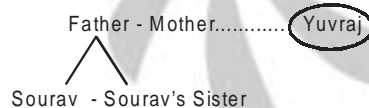
97. B According to Yuvraj,



According to Sourav



After adding the third information we get.



So Yuvraj is maternal uncle of Sourav.

98. B As per the question, there are 13 successive semicircles with radii 0.5 cm, 1.0 cm, 1.5 cm, and so on.
 \therefore Total length of the spiral
 $= \pi \times 0.5 + \pi \times 1.0 + \dots + \pi \times 6.5$
 $= \pi(0.5 + 1.0 + \dots + 6.5)$

We assume, $\pi = \frac{22}{7}$

Required total length = $\frac{22}{7} \times \frac{7}{2} \times 13 = 143$ cm

99. B When a constant value is added to all the numbers of a set, then there is no effect on standard deviation. But, if we multiply all the terms by any constant factor standard deviation of the resulting numbers also get, multiplied by that factor. Hence, by increasing the salary by 20%, standard deviation will also increase by 20%. Therefore, the new standard deviation will be $1.2 \times 400 = 480$.

100. C $P(\text{one person is unhealthy}) = \frac{1}{100}$

In a group of 50, number of unhealthy persons can be 0, 1, 2, 3, or 50.

Their probabilities are:

$$P(0 \text{ unhealthy}) = (0.99)^{50}$$

$$P(1 \text{ unhealthy}) = {}^{50}C_1 \times (0.01) \times (0.99)^{49}$$

$$P(2 \text{ unhealthy}) = {}^{50}C_2 \times (0.01)^2 \times (0.99)^{48}$$

....

$$P(50 \text{ unhealthy}) = {}^{50}C_{50} \times (0.01)^{50}$$

When no person is unhealthy, the pooled test will be negative and hence, in a single test the group shall be declared healthy. In all the other cases, one pool test + 50 individual tests (i.e. 51 tests) are conducted to ascertain the status of health.

$$\therefore P(\text{one test is required}) = (0.99)^{50} \approx 0.60$$

$$\text{and } P(51 \text{ tests are required}) = 1 - 0.60 = 0.40$$

$$\therefore \text{Required expectation} = 1 \times 0.60 + 51 \times 0.40 = 21$$

101. C If one picks up a number out of the six numbers, then the only case in which he/she will lose money is when none of the three dice shows the picked number on the top surface.

\Rightarrow Required probability of losing the game

$$= \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} = \frac{125}{216}$$

\therefore Probability of winning the game =

$$\left(1 - \frac{125}{216}\right) = \frac{91}{216} = 0.42$$

102. C Total cost = $R = \left(\frac{Z^3}{10} - 5Z^2 + 10Z + 5\right)$

Total variable cost = $\left(\frac{Z^3}{10} - 5Z^2 + 10Z\right)$

['5' is a constant value]

$$\text{Average variable cost (AV)} = \frac{\left(\frac{Z^3}{10} - 5Z^2 + 10Z\right)}{Z}$$

$$= \frac{1}{10}(Z^2 - 50Z + 100)$$

$$= \frac{1}{10}\{(Z - 25)^2 - 525\}$$

∴ At $Z = 25$, average variable cost is minimum.

103. B Consider the following harmonic progression.

$$1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$$

Here, $a = 1$, $b = \frac{1}{5}$ and $n = 3$, harmonic means between a and

b are such that $H_1 = \frac{1}{2}$, $H_2 = \frac{1}{3}$ and $H_3 = \frac{1}{4}$

Now, $\frac{H_1 + a}{H_1 - a} + \frac{H_n + b}{H_n - b}$ is same as

$$\frac{\frac{1}{2} + 1}{\frac{1}{2} - 1} + \frac{\frac{1}{4} + \frac{1}{5}}{\frac{1}{4} - \frac{1}{5}} = 6 = 2 \times 3$$

Only option (B) satisfies the condition and hence, it is the correct option.

104. D $\frac{{}^{n+2}C_8}{{}^{n-2}P_4} = \frac{57}{16}$

$$\Rightarrow \frac{(n+2)(n+1)(n)(n-1)}{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \frac{57}{16}$$

$$\Rightarrow (n+2)(n+1)(n)(n-1) = 57 \times 7 \times 6 \times 5 \times 4 \times 3$$

$$= 21 \times 20 \times 19 \times 18$$

$$\Rightarrow n = 19$$

105. D As per the question, a^2, b^2, c^2 are in geometric progression

$$\Rightarrow \frac{b^2}{a^2} = \frac{c^2}{b^2} \Rightarrow b^2 = \pm ac \quad \dots(i)$$

It is given that a, b and c are in arithmetic progression. If we take 'd' as the common difference then $a = b - d$ and $c = b + d$

$$\text{It is given that } a + b + c = \frac{3}{2}$$

$$\Rightarrow (b - d) + b + (b + d) = \frac{3}{2}$$

$$\Rightarrow b = \left(\frac{1}{2}\right)$$

$$\therefore a = \left(\frac{1}{2} - d\right) \text{ and } c = \left(\frac{1}{2} + d\right)$$

From equation (i),

$$\left(\frac{1}{2}\right)^2 = \pm \left(\frac{1}{2} - d\right) \left(\frac{1}{2} + d\right)$$

$$\Rightarrow d = 0, \pm \left(\frac{1}{\sqrt{2}}\right)$$

$$\text{Since } a < b < c, d = \frac{+1}{\sqrt{2}}$$

$$\therefore a = b - d = \left(\frac{1}{2} - \frac{1}{\sqrt{2}}\right)$$

106. C As a, b and c are in harmonic progression, therefore,

$$b = \frac{2ac}{a+c}$$

As per the question,

$$\log(a+c) + \log(a+c-2b) = \log[(a+c)(a+c-2b)]$$

$$= \log \left[(a+c) \times \frac{(a+c)^2 - 4ac}{(a+c)} \right]$$

$$= \log [(a-c)^2]$$

Since $a < c$, instead of expressing the given expression as $\log[(a-c)^2]$, we should express it as $\log[(c-a)^2] = 2 \log(c-a)$.

107. A $1^2 - 2^2 + 3^2 - 4^2 + \dots - 2001^2 - 2002^2 + 2003^2$

$$= (1^2 + 3^2 + 5^2 + \dots + 2003^2)$$

$$- (2^2 + 4^2 + 6^2 + \dots + 2002^2)$$

$$= (1^2 + 2^2 + 3^2 + 4^2 + \dots + 2003^2)$$

$$- 2(2^2 + 4^2 + 6^2 + \dots + 2002^2)$$

$$= (1^2 + 2^2 + \dots + 2003^2) - 8(1^2 + 2^2 + \dots + 1001^2)$$

We know, sum of squares of first n natural numbers

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

Sum of the series =

$$\left(\frac{2003 \times 2004 \times 4007}{6} \right) - \left(\frac{8 \times 1001 \times 1002 \times 2003}{6} \right)$$

$$= \frac{2003 \times 1002}{6} (8014 - 8008)$$

$$= \frac{2003 \times 1002 \times 6}{6} = 2007006$$

108. B As per the question, there are 9 married couples and no husband and wife should play in the same game.

We know that in a mixed double match there are two males and two females.

Step I: Two male members can be selected in

$${}^9C_2 = 36 \text{ ways}$$

Step II: Having selected two male members, 2 female members can be selected in ${}^7C_2 = 21$ ways

Step III: Two male and two female members can be played a particular game in 2 ways.

$$\text{Total number of arrangements} = 36 \times 21 \times 2 = 1512 \text{ ways.}$$

109. C We know:

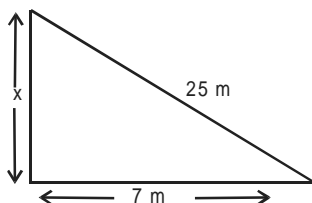
(I) Sum of any interior and exterior angles of a polygon is always 180° .

(II) Sum of all the exterior angles of a polygon is 360° . If the smallest interior angle is 120° , then largest exterior angle = 60° .

$$\Rightarrow \text{Second largest exterior angle} = 55^\circ$$

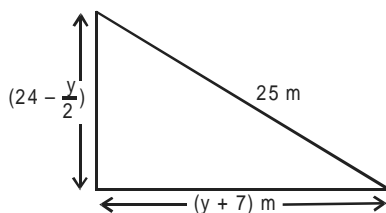
$$\Rightarrow (60^\circ + 55^\circ + 50^\circ + \dots + n \text{ terms}) = 360^\circ \Rightarrow n = 9$$

110. B **Initial position of the ladder:** If x is the height at which top of the ladder is above the ground.



$$\Rightarrow x = \sqrt{25^2 - 7^2} = 24 \text{ meters}$$

Final position of the ladder: Let ladder moves away y meters from the wall.



$$(25)^2 = (y + 7)^2 + \left(24 - \frac{y}{2}\right)^2$$

$$\Rightarrow y = 8 \text{ meters}$$

111. A The given expression

$$2 - \frac{\sqrt{6407522209}}{\sqrt{3600840049}} = 2 - \frac{80047}{60007} = 2 - (1.333961) = 0.666039$$

112. B It is given that $abc = 4$.

We know, $(a + b + c)$ will be minimum when a, b, c are constants and $a = b = c$.

As a, b, c are in arithmetic progression,

$$\Rightarrow a + b + c = 3b$$

This will be minimum when $a = b = c$,

$$b^3 = 4.$$

$$\Rightarrow b = 4^{1/3} = 2^{2/3}$$

113. A The given equation: $ax^2 + bx + c = 0$ If one of the root = α

$$\Rightarrow \text{The other root} = 2\alpha$$

Sum of roots:

$$\alpha + 2\alpha = \frac{-b}{a}$$

$$3\alpha = \frac{-b}{a} \quad \dots(i)$$

Product of roots:

$$2\alpha^2 = \frac{c}{a} \quad \dots(ii)$$

Equating the value of α^2 , we get

$$\frac{b^2}{9a^2} = \frac{c}{2a} \Rightarrow 2b^2 = 9ac.$$

114. C Let B = speed of boat in still water and R = speed of stream.

Then as per the question,

$$\frac{30}{B-R} + \frac{44}{B+R} = 10 \quad \dots(i)$$

$$\frac{40}{B-R} + \frac{55}{B+R} = 13 \quad \dots(ii)$$

$$\text{Equation (i)} \times 4 - \text{Equation (ii)} \times 3$$

$$\frac{120}{B-R} + \frac{176}{B+R} - \frac{120}{B-R} - \frac{165}{B+R} = (40 - 39)$$

$$\Rightarrow \frac{176}{B+R} - \frac{165}{B+R} = 1$$

$$\Rightarrow (B+R) = 11$$

$$\text{Similarly, } (B-R) = 5$$

Solving these two equations, we get $B = 8 \text{ km/hr.}$

$$115. B \cot^{-1} \left\{ \frac{\sqrt{1-\sin a} + \sqrt{1+\sin a}}{\sqrt{1-\sin a} - \sqrt{1+\sin a}} \right\}$$

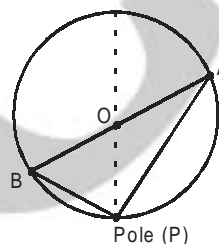
$$= \cot^{-1} \left\{ \frac{(\sqrt{1-\sin a} + \sqrt{1+\sin a})^2}{(\sqrt{1-\sin a})^2 - (\sqrt{1+\sin a})^2} \right\}$$

$$= \cot^{-1} \left\{ \frac{2+2\cos a}{-2\sin a} \right\}$$

$$= \cot^{-1} \left\{ \frac{1+\cos a}{-\sin a} \right\} = \cot^{-1} \left\{ \frac{2\cos^2 \frac{a}{2}}{-2\sin \frac{a}{2} \cdot \cos \frac{a}{2}} \right\}$$

$$= \cot^{-1} \left\{ -\cot \left(\frac{a}{2} \right) \right\} = \pi - \frac{1}{2}$$

116. C As per the question, the following figure can be drawn with 'O' as the center of the circle.



$$PA - PB = 7$$

As AB is the diameter,

$$\Rightarrow AB^2 = PA^2 + PB^2 \quad \dots(i)$$

$$13^2 = PA^2 + PB^2 \quad \dots(ii)$$

Solving equation (i) and (ii)

$$PA = 12 \text{ meters}$$

$$PB = 5 \text{ meters}$$

\therefore Option (C) is the correct choice.

117. B For discrete random variables, the Expected Value -E is equivalent to the probability-weighted sum of all the possible values. There are 2 different possibilities in choice 3. These are:

Possibility 1: M/s James will reach 75% of the customers. The probability of this possibility is 0.20. Under this possibility, M/s James is the distributor for each of the coming 5 years. The present value of the 5 years cumulative profit is: $5 \times (0.75) + 15 \times (0.75) = \text{Rs.}15 \text{ Crores.}$

Possibility 2: M/s James will continue to reach only 25% of the customers. The probability of this possibility is 0.80. Under this possibility, M/s James will be the distributor for the first year but M/s Jagan will be the distributor for the next 4 years. The present value of the 5 years cumulative profit is:

$$5 \times (0.25) + 15 \times (0.55) = \text{Rs.}9.5 \text{ Crores.}$$

The expected present value of the 5 years cumulative profit is:

$$E = 15 \times 0.20 + 9.5 \times 0.8 = \text{Rs.}10.6 \text{ Crores.}$$

118. D In order to compare the 3 different choices, we need to compare the expected present values of the five years cumulative profit in each of the cases.

Case 1: The expected present values of the five years cumulative profit under this case is: $(5 \times 0.55 + 15 \times 0.55) \times (1.00) = \text{Rs.11 Crores.}$

Case 2: The expected present values of the five years cumulative profit under this case is:
 $(5 \times 0.60 + 15 \times 0.60) \times (0.60) + (5 \times 0.40 + 15 \times 0.55) \times (0.40) = \text{Rs.11.3 Crores.}$

Case 3: As calculated in question above, the expected present values of the five years cumulative profit under this case is Rs.10.6 Crores.

It is evident that the statements written in options (A), (B) and (C) are false.

119. B The two possibilities for Case 3 are:

Possibility 1: M/s James will reach 55% of the customers. The probability of this possibility is 0.70. The present value of the 5 years cumulative profit is:
 $5 \times (0.55) + 15 \times (0.55) = \text{Rs.11 Crores.}$

Possibility 2: M/s James will continue to reach only 25% of the customers. The probability of this possibility is 0.30. The present value of the 5 years cumulative profit is:
 $5 \times (0.25) + 15 \times (0.55) = \text{Rs.9.5 Crores.}$

The expected present value of the 5 years cumulative profit is:

$$E = 11 \times 0.70 + 9.5 \times 0.30 = \text{Rs.10.55 Crores.}$$

The expected values for Case 1 and Case 2 will remain unaffected at Rs.11 Crores and Rs.11.3 Crores respectively.

120. A As per the question there are 10 cover spots out of which
 (i) Three spots are there with no prize (identical)
 (ii) Two spots of the same sign (Prize)
 (iii) Five other spots which are distinct

Let three spots of no prize are (x, x, x), two spots of same sign are (P, P) and five other spots are (A, B, C, D, E).

$$\text{Total number of cases without restriction} = \frac{10!}{3!2!}$$

Total number of favourable cases happen in the following ways which shows sequence of can covering

Case I: Second uncovering is 'P'

$$\begin{array}{cccccccccc} P & P & & & & & & & & \\ = {}^8C_3 \times 5! \times 1 \end{array}$$

Case II: $\begin{array}{cccccccccc} & P & & & & & & & & \end{array}$

$$\text{Number of ways} = {}^7C_3 \times 5! \times 2$$

Case III: $\begin{array}{cccccccccc} & & P & & & & & & & \end{array}$

$$\text{Number of ways} = {}^6C_3 \times 5! \times 3$$

Case IV: $\begin{array}{cccccccccc} & & & P & & & & & & \end{array}$

$$\text{Number of ways} = {}^5C_3 \times 5! \times 4$$

Case V: $\begin{array}{cccccccccc} & & & & P & & & & & \end{array}$

$$\text{Number of ways} = {}^4C_3 \times 5! \times 5$$

Case VI: $\begin{array}{cccccccccc} & & & & & P & & & & \end{array}$

$$\text{Number of ways} = {}^3C_3 \times 5! \times 6$$

Total number of favourable cases

$$= \frac{{}^8C_3 \times 5! \times 1 + {}^7C_3 \times 5! \times 2 + {}^6C_3 \times 5! \times 3 + {}^5C_3 \times 5! \times 4 + {}^4C_3 \times 5! \times 5 + {}^3C_3 \times 5! \times 6}{\left(\frac{10!}{3!2!}\right)} = 0.10$$

121. D Number of ways in which a pair of shoes can be selected

$$= {}^3C_1 = 3 \text{ ways}$$

Number of ways in which "lower wear" can be selected
 $= (3 + 4) = 7 \text{ ways}$

Number of ways in which "upper wear" can be selected
 $= 3 + 6 + 3 \times 6 = 27 \text{ ways}$

Number of ways in which jacket can be chosen or not chosen
 $= 3 \text{ ways (No jacket, 1st jacket, 2nd jacket)}$

$$\Rightarrow \text{Total number of different outfits} = 3 \times 7 \times 27 \times 3 = 1701.$$

122. C The given equation can be written as:

$$\tan x + \frac{\tan x + \tan \pi/3}{1 - \tan x \tan \pi/3} + \frac{\tan x + \tan 2\pi/3}{1 - \tan x \tan 2\pi/3} = 3$$

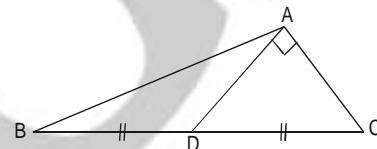
$$\Rightarrow \tan x + \frac{\tan x + \sqrt{3}}{1 - \sqrt{3} \tan x} + \frac{\tan x - \sqrt{3}}{1 + \sqrt{3} \tan x} = 3$$

$$\Rightarrow \tan x + \frac{(\tan x + \sqrt{3})(1 + \sqrt{3} \tan x) + (1 - \sqrt{3} \tan x)(\tan x - \sqrt{3})}{1 - 3 \tan^2 x} = 3$$

$$\Rightarrow \tan x + \frac{8 \tan x}{1 - 3 \tan^2 x} = 3 \Rightarrow \frac{\tan x(1 - 3 \tan^2 x) + 8 \tan x}{1 - 3 \tan^2 x} = 3$$

$$\Rightarrow \frac{3(3 \tan x - \tan^3 x)}{1 - 3 \tan^2 x} = 3 \Rightarrow 3 \tan 3x = 3 \Rightarrow \tan 3x = 1$$

123. A As per the data given in the question, following figure can be drawn:



Using Pythagoras Theorem, we get
 $AD^2 + AC^2 = CD^2 \dots (i)$

Using Apollonius Theorem, we get
 $AB^2 + AC^2 = 2AD^2 + 2CD^2 \dots (ii)$

$$\Rightarrow AB^2 + AC^2 = 2AD^2 + \frac{BC^2}{2}$$

$$\Rightarrow AB^2 + AC^2 = 2(CD^2 - AC^2) + \frac{BC^2}{2}$$

$$\Rightarrow AB^2 + AC^2 = 2\left(\frac{BC^2}{4} - AC^2\right) + \frac{BC^2}{2}$$

$$\Rightarrow 3AC^2 = BC^2 - AB^2$$

124. D Let the three solids have base radius and height of x units. The curved surface areas of the three solids are:

$$\text{Cylinder: } 2\pi x \times x = 2\pi x^2$$

$$\text{Hemisphere: } 2\pi x^2$$

$$\text{Cone: } \pi \cdot x \times (\text{Slant height}) = \pi \cdot x \times (\sqrt{2}x)$$

$$\text{The ratio of curved surface areas is } \sqrt{2} : \sqrt{2} : 1$$

125. B Option A:

Year	Required %
1993	46.7
1994	44.4
1995	41.9
1996	40.6
1997	39.2
1998	38.7
1999	38.1
2000	36.7
2001	34.1
2002	33.3
2003	31.9

Hence, option (A) is not true.

Option B: The special type wagons expressed as a percentage of total wagons is 17.531% and is maximum.

Hence, option (B) is true.

Option C: The open high sided wagons expressed as a percentage of total wagons increased during 1994 to 2001 and also from 2001 to 2002.

126. C Option (A): Required percentage in 1995 and 2001 is 16.45% and 17.5% respectively.
 Option (B): Required percentage in 1998 and 2004 is 16.61% and 17.3% respectively.
 Option (C): Required percentage in 2000 and 2002 is 17.2% and 17.2% respectively.
 Option (D): Required percentage in 1993 and 1994 is 14.89% and 15.75% respectively.

127. C Required percentage in 2002, 2005, 2004 and 2003 is 4.4% 4.93%, 5% and 4.99% respectively.

128. A Option A: Required growth rate is – 4.18%
 Option B: Required growth rate is – 4.14%
 Option C: Required growth rate is – 4.13%
 Option D: Required growth rate is – 4.11%
 Hence, the lowest of all the growth rate is – 4.18%.

129. C The statement given in option (C) is false as the annual percentage growth rate of average wagon capacity is maximum in the year 2001.

130. B Option A: Required growth rate is – 6.73%
 Option B: Required growth rate is – 5.03%
 Option C: Required growth rate is – 8.25%
 Option D: Required growth rate is – 7.33%

For questions 131 to 135:

	P	Q	R	S	Total
1990	45	99	75	115	334
1991	25	41	93	158	317
1992	40	108	107	166	421
1993	38	60	63	139	300
1994	76	41	132	88	337
1995	56	70	120	97	343
Total	280	419	590	763	2052

131. B It can be easily concluded from the data given in the above table that the annual growth rate of total production is highest in 1992.

132. D The stability of production during 1990 to 1995 for product P, Q, R and S is 0.92, 1.04, 1.43 and 1.63 respectively. Hence, product S is the most stable one.

For questions 133 to 135:

	P (Rs.9)	Q (Rs.4)	R (Rs.13)	S (Rs.3)	Total
1990	405	396	975	345	2121
1991	225	164	1209	474	2072
1992	360	432	1391	498	2681
1993	342	240	819	417	1818
1994	684	164	1716	264	2828
1995	504	280	1560	291	2635
Total	2520	1676	7670	2289	

133. C The total revenue of all the products is lowest in the year 1993.

134. B The product Q fetches the lowest revenue.

135. C It can be concluded from the data calculated in the table given above that the statement given in option (C) is true.

For questions 136 to 140:

136. C Option A: Required growth rate is 179.25%
 Option B: Required growth rate is 184.29%
 Option C: Required growth rate is 188.60%
 Option D: Required growth rate is 178.63%

137. A Option A: Required growth rate is – 68.52%
 Option B: Required growth rate is – 63.18%
 Option C: Required growth rate is – 67.78%
 Option D: Required growth rate is – 67.83%

138. C Option A: The annual FDI growth rate for Gujarat in 2001 is – 23.28 and the corresponding figure for Karnataka in 2005 is – 22.51%.
 Option B: The annual FDI growth rate for Kerala in 2001 is 42.29% and the corresponding figure for Uttar Pradesh in 2004 is 43.99%.
 Option C: The annual FDI growth rate for Kerala in 2005 is 45.73% and the corresponding figure for Punjab in 2007 is 45.55%.

139. C Option A: The absolute annual increase in FDI inflow in Bihar in 2001 is 4927 and the corresponding figure for Rajasthan in 2007 is 4957.
 Option B: The annual FDI growth rate for West Bengal in 2006 is – 14.05% and the corresponding figure for Uttar Pradesh in 2003 is – 16.56%.
 Option C: The absolute annual increase in FDI inflow in Madhya Pradesh in 2004 is 3870 and the corresponding figure for Maharashtra in 2005 is 3766.

140. C Option A: The absolute annual increase in FDI inflow in Haryana in 2006 is 2892 and the corresponding figure for Punjab in 2007 is 2888.
 Option B: Among all the States, in 2003 the absolute annual increase in FDI inflow was maximum for Maharashtra.
 Option C: The absolute annual increase in FDI inflow in Bihar in 2003 is 294 and the corresponding figure for Karnataka in 2001 is 254.
 Option D: The FDI inflow in Kerala over 2002 to 2007 was not the lowest across all the states. For, example in 2002, the FDI inflow was lowest in Bihar.

For questions 141 to 145:

141. D Option A: Export from Canada expressed as a proportion of export from North America in 2000 is 0.22583.
Option B: Export from Germany expressed as a proportion of export from Europe in 2004 is 0.22461. Option C: Export from China expressed as a proportion of export from Asia in 2004 is 0.22363.
Option D: Export from Japan expressed as a proportion of export from Asia in 2003 is 0.22065.
142. C Option A: The annual export growth rate of Argentina in 2003 was 15.27% and the corresponding figure for US in 2006 is 14.6%.
Option B: The annual export growth rate of Africa in 2004 was 30.33% and the corresponding figure for Latin America in 2004 is 29.94%.
Option C: The annual export growth rate of US in 2004 was 12.93% and the corresponding figure for Canada in 2005 is 13.54%.
143. B Option A: Required growth rate is 13.70%.
Option B: Required growth rate is 13.87%.
Option C: Required growth rate is 13.58%.
Option D: Required growth rate is 13.22%.

144. D Option A: Export from Argentina expressed as a proportion of export from Latin America in 2001 is 0.14074 and export from Nigeria expressed as a proportion of export from Africa in 2004 is 0.13548.
Option B: Export from UK expressed as a proportion of export from Europe in 2000 is 0.10837 and export from Argentina expressed as a proportion of export from Latin America in 2005 is 0.11366.
Option C: The annual export growth rate in Argentina in 2004 is 0.16945 and the corresponding figure for Asia in 2005 is 0.15299.
Option D: Export from South Africa expressed as a proportion of export from Africa in 2001 is 0.21294 and export from China expressed as a proportion of export from Asia in 2003 is 0.20494.
145. B Option A: The absolute annual increase in exports from Asia in 2003 is 330500 and the corresponding figure in 2006 is 518700.
Option B: The absolute annual increase in exports from Germany in 2001 is 19827 and the corresponding figure for US in 2003 is 31668.
Option C: The absolute annual increase in exports from Brazil in 2005 is 21833 and the corresponding figure for Japan in 2002 is 13230.

For questions 146 to 147:

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
Revenue	700	1400	1200	900	1100	400	200	700	600	800	900	809.09
Profit	0	100	300	150	0	150	100	200	0	400	300	154.55
Selling Price per Unit	10	14	12	12	11	8	10	14	10	10	15	11.45
Number of Units	70	100	100	75	100	50	20	50	60	80	60	69.55
Cost Price	700	1300	900	750	1100	250	100	500	600	400	600	654.55
Cost price per Unit	10	13	9	10	11	5	5	10	10	5	10	8.91

146. B From the data given in the above table, it can be easily concluded that the year in which per unit cost is HIGHEST is 2001.
Hence, option (B) is the correct choice.
147. B Average quantity sold during the period 2000 – 2010 is close to 70 units.

148. C

	Volatility
Price per Unit	0.61
Cost per Unit	0.9
Total Profit	2.59
Revenue	1.48

From the data calculated in the table given above, we can conclude that total profit has the highest volatility.
Hence, option (C) is the correct choice.

For questions 149 and 150:

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Selling Price per Unit	8	11.2	9.6	9.6	8.8	8	10	14	10	10	15
Revenue	560	1120	960	720	880	400	200	700	600	800	900
Cost price per Unit	10	13	9	10	11	6	6	12	12	6	12
Cost Price	700	1300	900	750	1100	300	120	600	720	480	720
Profit	-140	-180	60	-30	-220	100	80	100	-120	320	180

149. C From the data calculated in the table given above, we can see that in 5 years there is a loss.
150. B Previous cumulative profit = Rs.1700 and after the change the cumulative profit is Rs.150.
Required difference = Rs.1700 – Rs.150 = Rs.1550.