Answers and Explanations

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

1. 3 Mersenne numbers (M) will be prime for p = 2, 3, 5, 7 and 13. For p = 14 onwards, the value of M will cross 10000.

2. 3 Let O be the center of the circle. Drop perpendiculars OM and ON on AB and DC respectively. Let OM = x cm and ON = y cm. Evidently (x + y) = 7.5 cm. Let the radius of the circle be r cm.
In triangle OMB, $x^2 + 1^2 = r^2$ ...(i)
and in triangle ONC, $y^2 + 4^2 = r^2$ ...(ii)
Subtracting equation (ii) from (i), $x^2 - y^2 = 15$
Or, (x + y)(x − y) = 15
Or, x − y = 2
Therefore, x = 4.75 cm

So, diameter of the circle $= 2\sqrt{(4.75)^2 + 1} = 9.7$ cm

3. 3 For x ≥ 4

$$\frac{\left|\frac{x}{4} - 1\right| + \frac{1}{2}}{\left|\frac{x}{8} - \frac{1}{4}\right|} = \frac{\frac{x}{4} - 1 + \frac{1}{2}}{\frac{x}{8} - \frac{1}{4}} = 2 = y$$

So, for any integral value of x between [4, 100] we will have integral values of y for every value of x.
Therefore number of integral solutions = 97.
For x < 2

$$\frac{\left|\frac{x}{4} - 1\right| + \frac{1}{2}}{\left|\frac{x}{8} - \frac{1}{4}\right|} = \frac{1 - \frac{x}{4} + \frac{1}{2}}{\frac{1}{4} - \frac{x}{8}} = \frac{12 - 2x}{2 - x} = 2 + \frac{8}{2 - x}$$

Hence, whenever $\frac{8}{(2 - x)}$ is an integer y will be inte-

ger as well. Values of x between [–100, 2] for which y is an integer are x = {–6, –2, 0, 1}.
Number of integral solutions = 4
Out of x = 2 and 3, we get integral value of y for x = 3
Total number of integral solutions = 97 + 4 + 1 = 102

4. 5 S = {(2 × 3 × 5), (3 × 5 × 7), (5 × 7 × 11), (7 × 11 × 13), (11 × 13 × 17), (13 × 17 × 19), (17 × 19 × 23) and (19 × 23 × 29)}
So, S contains 8 elements.
Similarly N could be {(2 × 3 × 5), (7 × 11 × 13), (17 × 19 × 23)} or {(3 × 5 × 7), (11 × 13 × 17), (19 × 23 × 29)}.
So, N contains 3 elements. So the answer is 5.

5. 4 **Case I:**
When the password contains 2 digits and 3 vowels.
Number of possible passwords = $^3C_2 \times {}^5C_3 \times {}^3C_1 \times {}^2C_1 \times$ 3! × 2.
Case II:
When the password contains 3 digits and 2 vowels
Number of possible passwords = $^3C_3 \times {}^5C_1 \times {}^3C_1 \times {}^2C_1 \times$ 3! × 2.
Total number of passwords that Sudip can create = 4 × 720
= 2880.

6. 2 Total amount with the man after first T years = 1000 + 150T
Amount invested again = 500 + 75T
Amount lost due to the investment

$$= \frac{6 \times 12.50}{100} \times (500 + 75T)$$

$$= \frac{3}{4}(500 + 75T)$$

Total amount with the man after T + 6 years

$$500 + 75T + \frac{1}{4}(500 + 75T) = 1000$$

T = 4 years.

7. 1 The only integral value of k satisfying 15 < |k² − 8k| < 33 are −2, 4 and 10.
The discriminant of the equation would be maximum possible when b = 10, a and c equal to −2 and 4 not necessarily in that   particular order.

In this case the value of $\dfrac{ac}{b} = -0.8$.

8. 1 The questions asks nothing but to find out numbers between 500 and 1000 as the remaining numbers surely don't fall under the conditions required. The numbers can be divided into three sets.
A. Numbers where neither tenth nor unit place is filled by either 5, 6, 7, 8 or 9.
   3 such cases are possible (12, 24, 32) and in each case hundredth place can be filled in 5 ways (by 5, 6, 7, 8 or 9). Hence total ways 3 × 5 = 15.
B. Numbers where one of the tenth or unit place is filled by either 5, 6, 7, 8 or 9.
   9 such cases are possible (16, 28, 36, 48, 52, 64, 72, 84, 92) and in each case hundredth place can be filled in 4 ways. Hence total ways 9 × 4 = 36.
C. Numbers where both of the tenth and unit place is filled by either 5, 6, 7, 8 or 9.
   4 such cases are possible (56, 68, 76, 96) and in each case hundredth place can be filled in 3 ways. Hence total ways 3 × 4 = 12.
Hence, total number of ways = 15 + 36 + 12 = 63.

9. 5 If 6 is the middle digit then the units place can be occupied by either 4 or 8.
If its 4, then hundredth place can be occupied in ways (by 5, 7, 8 or 9)
If its 8, then hundredth place can be occupied in 3 ways
(by 5, 7 or 9)
Hence, total numbers with 6 as middle digit = 3 + 4 = 7

Probability = $\dfrac{7}{63} = \dfrac{1}{9}$

10. 1 $g(-2.5) = f\{f(-2.5)\} = f(2) = 2$

$g(-3.5) = f\{f(-3.5)\} = f(2) = 2$

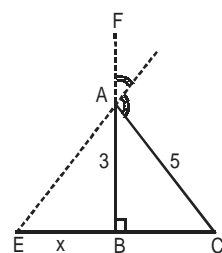$h(5.5) = g\{g(5.5)\} = g\{f(f(5.5))\} = g\{f(1.5)\} = g(1.5)$

$f(f(1.5)) = f(1.5) = 1.5$

& $h(7.5) = g\{f(f(7.5))\} = g\{f(1.5)\} = 1.5$

$\Rightarrow \dfrac{g(-2.5) \times g(-3.5)}{h(5.5) \times h(7.5)} = \dfrac{2 \times 2}{1.5 \times 1.5} = \dfrac{16}{9}$

Hence (1) is the correct choice.

11. 5

Let, the length of BE be 'x' cm.

$BC = \sqrt{AC^2 - AB^2} = 4cm$

Using the angle bisector theorem in ∆ABC, we get that

$\dfrac{AB}{AC} = \dfrac{BE}{CE} \Rightarrow \dfrac{3}{5} = \dfrac{x}{x+4} \Rightarrow x = 6$ cm

$\Rightarrow AE = \sqrt{AB^2 + BE^2} = \sqrt{45}$ cm $= 3\sqrt{5}$ cm.

12. 2 Average is close to 121. So 5 numbers must be below 121 and the other five must be above 121. So, 10 consecutive prime numbers satisfying this condition are 101, 103, 107, 109, 113, 127, 131, 137, 139 and 149. The prime number just before 101 is 97. So, the minimum value of N is 150 and minimum possible value of M is 97.
Minimum possible value of M + N = 247.

13. 4 There are only 7 pure numbers, which are divisible by 4.
They are 1012, 1120, 2020, 2200, 1300, 3100 and 4000.

14. 4 There are only 5 pure numbers which have more than one digit but all the digits are distinct.
They are 20, 102, 120, 201 and 210.

15. 5 Let the Marked price and the cost price be 100x and 100y respectively.
From the first condition we can say that (100 + P)y = (100 − P)x

Or $\dfrac{x}{y} = \dfrac{100 + P}{100 - P}$.   ...(i)

Similarly, From the second condition we can say that (100 + P + 15) y = (100 − P + 10)x

Or $\dfrac{x}{y} = \dfrac{115 + P}{110 - P}$ ...(ii)

Solving (i) and (ii), we get that P = 20 and $\dfrac{x}{y} = 1.5$

Therefore the required mark-up is 50%.

16. 3 Given that a, b and c are in G. P.
Let b = ar
c = a.r²
As c = 9(b − 2a) we will have:-
a.r² = 9(a.r − 2a)
or ar² − 9ar + 18a = 0
or r² − 9r − 18 = 0   (as, a ≠ 0)
$\Rightarrow$ r = 3 or r = 6
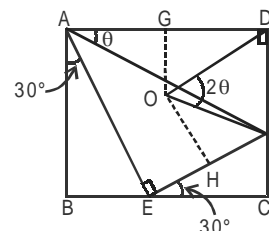$\Rightarrow$ Two quadratic equations are possible,
ax² + 3ax + 9a = 0
or ax² + 6ax + 36a = 0
Accordingly, the product of the roots can either be

$\dfrac{9a}{a} = 9$ or $\dfrac{36a}{a} = 36$.

Hence, (3) is the corrrect option.

17. 3

Clearly AEFD is a cyclic quadrilateral. Also, AF has to be the diameter (since $\angle ADF = 90°$) and it passes through O (which is the center of the circle circumscribing AEFD).

Hence, $\angle DOF = 2\angle DAF$

Taking $AB = CD = \sqrt{3}x$, $BC = AD = 2x$

In $\triangle ABE$: $BE = AB \tan 30 = x \Rightarrow EC = x$

In $\triangle ECF$: $FC = EC \tan 30° = \dfrac{x}{\sqrt{3}} \Rightarrow DF = \dfrac{2x}{\sqrt{3}}$

$\tan\theta = \dfrac{DF}{AD} = \dfrac{1}{\sqrt{3}}$

$\Rightarrow \theta = 30°$

Hence, $\angle DOF = 60°$

18. 1   From the quadratic equation $\alpha + \beta = \dfrac{5}{4}$ and $\alpha\beta = \dfrac{3}{8}$

This clearly suggests that $\alpha, \beta \in (0,1)$

Now, $S_1 + S_3 + S_5 + S_7 + ... + S_\infty$

$= \alpha + \beta + \alpha^3 + \beta^3 + \alpha^5 + \beta^5 + \alpha^7 + \beta^7 .... \alpha^\infty + \beta^\infty$
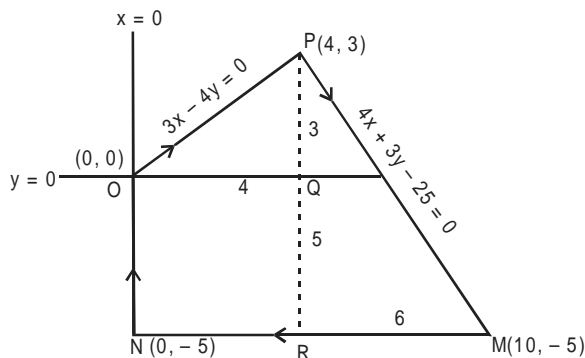
$= (\alpha + \alpha^3 + \alpha^5 + \alpha^7 + ... + \alpha^\infty) + (\beta + \beta^3 + \beta^5 + \beta^7 + ... + \beta^\infty)$

$= \dfrac{\alpha}{1 - \alpha^2} + \dfrac{\beta}{1 - \beta^2}$

$= \dfrac{\alpha + \beta - \alpha\beta^2 - \beta\alpha^2}{1 - \alpha^2 - \beta^2 + \alpha^2\beta^2} = \dfrac{(\alpha + \beta)(1 - \alpha\beta)}{1 - (\alpha + \beta)^2 + 2\alpha\beta + \alpha^2\beta^2}$

$\Rightarrow S_1 + S_3 + S_5 + S_7 + ... + S_\infty = \dfrac{50}{21}$.

19. 4   The figure given below describes the path followed by the spider.

Solving, $3x - 4y = 0$ and $4x + 3y - 25 = 0$ we get the coordinates of P = (4, 3).
Y-coordinate of M = – 5.
Putting this value of y in $4x + 3y - 25 = 0$, we get that x = 10
$\therefore$ Coordiantes of point M is (10, – 5).
Total distance travelled by the spider
= OP + PM + MN + ON = 5 + 10 + 10 + 5 = 30 units

20. 2   Area of the region bounded by the path followed by the spider = Area of the $\triangle POQ$ + Area of the $\triangle PRM$ +

Area of the rectangle ONRQ = $\dfrac{1}{2} \times 3 \times 4 + \dfrac{1}{2} \times 8 \times 6$

$+ 4 \times 5 = 50$ square units.

21. 3   Let the numbers be N1 = a × k and N2 = b × k.
Now, since gcd (a, b) = 1,so LCM of N1 and N2 = a × b × k.
So the product of the numbers and their LCM = $a^2 \times b^2 \times k^3$
Now, as per question $a^2 \times b^2 \times k^3 = Z^2$, where Z is an integer.
$(a \times b \times k)^2 \times k = Z^2$
So, k must be a perfect square and hence in the given set S we need to check for the perfect squares.
So, k is 4,9,16 …121 which are total 10 in number.

Hence, option (3) is right.

22. 4   Total number of students having prior work experience = 40
Total number of engineers having prior work experience = 32
Let the number of engineers who do not have prior work experience = x.
Total number of non-engineers in the batch = 120 – x + 8
= 128 – x.

Total number of commerce graduates $= \dfrac{128 - x}{2}$.

Total number of engineers = 32 + x.
Minimum possible value of x such that the number of engineers is greater than the number of commerce graduates is 22.

23. 3   Let AB = BC = a units.

$\dfrac{FC^2}{BC^2} = \dfrac{\text{area}\triangle GFC}{\text{area}\triangle ABC} = \dfrac{1}{2} \Rightarrow FC = \dfrac{a}{\sqrt{2}} = AD$

Hence, $BF = BD = a - \dfrac{a}{\sqrt{2}} = \dfrac{\sqrt{2} - 1}{\sqrt{2}}a$

$BO = \sqrt{2} \times BF = (\sqrt{2} - 1)a$

Also, BH has to be a straight line passing through O

(due to symmetry of the figure), therefore $BH = \dfrac{a}{\sqrt{2}}$

$OH = \left[\dfrac{1}{\sqrt{2}} - (\sqrt{2} - 1)\right]a = \dfrac{\sqrt{2} - 1}{\sqrt{2}}a$

Hence, $BO : OH = \sqrt{2} : 1$

For questions 24 and 25:
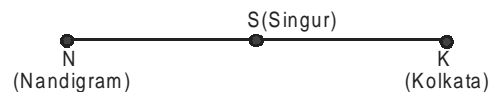
NS = 7000 m and SK = 10,000 m
Speed of the car of Mamta = 36 kmph = 10 m/s.
Case I: Buddha moves towards Nandigram and Biman moves towards Kolkata.
Case II: Biman moves towards Nandigram and Buddha moves towards Kolkata.

Time taken for Mamta and Buddha to meet from the instant Mamta starts moving $= \dfrac{(7000 - 600 \times 4)}{14} = \dfrac{2300}{7}$ s. (when the condition is as stated in Case I).

Time taken for Mamta and Buddha to meet from the instant Mamta starts moving $= \dfrac{(7000 + 600 \times 4)}{6} = \dfrac{4700}{3}$ s. (when the condition is as stated in Case II).

Time taken for Mamta and Biman to meet from the instant Mamta starts moving $= \dfrac{(7000 + 600 \times 3)}{7} = \dfrac{8800}{7}$ s. (when the condition is as stated in Case I).

Time taken for Mamta and Biman to meet from the instant Mamta starts moving $= \dfrac{(7000 - 600 \times 3)}{13} = 400$ s. (when the condition is as stated in Case II).

24. 4   The required time interval between the time when Mamta met Buddha and Mamta met Biman is $13\dfrac{2}{21}$ s, therefore the condition is as stated in Case I.
Total time elapsed from the instant Biman started moving till the instant Mamta meets Biman
$= 600 + \dfrac{8800}{7} = \dfrac{13000}{7}$ s.
Distance between Buddha and Biman when Mamta meets Biman $= \dfrac{13000}{7} \times (4 + 3) = 13000$ m $= 13$ km.

25. 2   Since Prakash met Buddha first on his way, therefore the condition is as stated in Case II.
Distance between Biman and Kolkata when Mamta met Biman
$= 10000 + (400 + 600) \times 3 = 13000$ m $= 13$ km.
Time of the day when Mamta met Biman = 9:16:40 a.m.
Time available for Prakash to meet Biman = 1 minute 40 seconds.
Speed of Prakash's car
$= \dfrac{13000}{100} = 130$ m/s $= 468$ kmph.

26. 2   Option (2) is correct. The author explains that the predicament lies in locating and generating a consensus on the issue of determinant factors of any phenomena.

27. 1   Option (1) is correct. The first paragraph suggests the attitude of the social scientists in relation to the determinant factors of supra- sociological phenomena.

28. 5   Option (5) is the right choice. None of the options (1) to (4) are correct. Refer paragraph 2.

29. 3   Option (3) is correct. This cannot be said to be true as per the passage.

30. 4   Option (4) is correct. The passage is talking about the myopic view and the rigid stance of the Social scientists.

31. 4   (1) is a direct statement by the author. (2) is incorrect. (3) is a concern expressed by the author-but not indirectly. (5) is again incorrect. But (4) is a personal fact which gets admitted indirectly by the author.

32. 3   Refer Paragraph 1 where the author mentions (3).

33. 3   'Decent' in (1) is a subjective word, but is indicated in Paragraph 4. So we cannot say (1) is wrong. (5) also is not wrong because his process of turning religious was 'in his own fashion' which was different. (2) and (4) are true. But (3) is incorrect since the passage says that he was not exempt from work with his hands

34. 3   Choice (3) seems to be the motive, which is the core cause of writing the passage.

35. 5   All the statements are true as per the passage. Refer the last two paragraphs. Hence (5)

36. 1   The passage is clearly divided into 2 parts. Until the third para, the author reports how the financial statements have been managed and from the fifth paragraph goes on to discuss the implications of this on the future. Hence (1)

37. 1   Only (1) can be inferred from the first and second paragraphs of the passage. Hence option (1) is correct.

38. 3   Refer to the last two sentences of paragraph 7. Hence option (3) is correct.

39. 1   Here creative is used synonymously with unethical. The author is obviously being sarcastic. Hence option (1) is correct.

40. 2   Except (2) all others are partial statements expressing the thematic purpose. Hence option (2) is correct.

41. 2   The word 'now' in answer option (2) signifies a comparison. The paragraph talks about the 'smallest fault' being fixed and then answer option (2) compares it for the entire car being reassembled.

42. 3.   The paragraph builds up to the "impasse" and answer choice (3) states the possibility of the same citing the limitations of the human intellect.

43. 5   Answer choice (5) gives a concrete example of the trend described in the paragraph.

44. 1   The paragraph talks about the response to unification being "surprise". This thread is continued in option (1).

45. 4   Option (1) is incorrect as the paragraph has an ironical tone which criticizes the arrival of cable television in rural areas as it is highly commercialized and hardly relates with the rural people. Option (2) is out of context for the paragraph. Option (3) is just the opposite of what the author is trying to state in the given paragraph. Option (5) is again irrelevant for the given paragraph as there is no hint provided for this particular information. Hence, Option (4) is the correct answer because it rightly follows the idea presented in the given paragraph as it questions the validity of showing a wealthy Indian family life in front of poor countryside rural villagers.

46. 3   Statements 1 & 4 are verifiable and hence facts. Statements 2 and 3 are personal opinions / judgments.

47. 5   Statements 3 & 4 are clearly facts since they are verifiable. Statement 1 is a judgment since 'Reddys being on the defensive' could be the writer's perspective . Statement 2 is an inference since it bases itself on the report—— it is a conclusion based on the facts of the report.

48. 3   Statements 1 & 3 are facts. Statement 2 is an opinion expressing approval and hence a judgment. Statement 4 is an inference –a conclusion about the unknown based on the reasoning offered in the statement.

49. 1   Statement 1 is a Judgement as it is an opinion expressing disapproval. Statement 2 is an inference based on the fact-exit from the state. Statement 3 is a verifiable fact. Statement 4 is again an opinion and hence a judgment.

50. 4   Statements 1 and 2 are facts. Statement 3 is an inference-a conclusion about the reason for the price rise. Statement 4 is
a judgement.

For questions 51 to 55:
Each of the participants received at least one vote in round 1. If the minimum number of votes received is 2, then 4 of the 11 votes are accounted for, since two of the contestants were tied for the last place in Round 1. Payal has received 4 votes. Taking these votes into consideration, 8 votes are accounted for. The remaining 3 votes can be divided among the other two participants as either (3 + 0) or (2 + 1), both of which are not possible. (3 + 0) is not possible because each participant has received at least 1 vote and (2 + 1) is not possible because we have considered the lowest number of votes as 2.

If the minimum number of votes received by two participants is 3 each, then including Payal's 4 votes, 10 out of 11 votes would have been accounted for and therefore the remaining two participants cannot receive at least 1 vote each.

Therefore, the only possible combination is when two participants receive 1 vote each (the minimum), Payal receives 4 votes while the other 2 participants receive 3 and 2 votes respectively.

Further, one of the participants has received '0' votes in round 2.
i.   That participant cannot be Priti because she has received 1 vote in round 2.
ii. That participant cannot be Priyanka because Mr. Biyani has voted for her in round 2.
iii. That participant cannot be Payal because the judge who voted for Poonam in round 1 voted for her in round 2
iv. That participant cannot be Pooja because 50% of the judges who voted for Payal in round 1 voted for Pooja in round 2.
v.   Therefore, it is Poonam who got '0' votes in round 2.

Further, it is given that the judge who voted for Poonam in round 1 voted for Payal in round 2. Therefore, Poonam would have got 1 vote in round 1. Also, Payal would have got 3 votes in round 2. (50% of votes from earlier round and 1 vote of the judge who voted for Poonam in round 1).

The remaining 8 votes were divided between Pooja and Priyanka. For this to be possible and Priyanka to be joint second with another person, the only possible combination in round 2 can be:
Priti : 1 vote, Payal : 3 votes, Priyanka : 3 votes, Pooja : 5 votes
From condition II, Pooja got 2 additional votes in round 2. Therefore Pooja would have got 3 votes in round 1. Priyanka got 1

additional vote of Mr. Biyani in round 2 and ended with 3 votes. Therefore Priyanka would have got 2 votes in round 1.
The number of votes received after the first 2 rounds were as follows:

	Pooja	Payal	Priti	Priyanka	Poonam
	B'lore	Delhi	B'lore		
Round 1	3	**4**	1	2	1
Round 2	5	3	**1**	3	0

Since Poonam was did not contest in round 3, Priyanka must be the other girl from Delhi. Further, the total number of votes in Round 3 is 13. (Poonam will also vote). From condition IV, the total votes won by Pooja and Priti (two girls from Bangalore) will be 7 while Payal and Priyanka (two girls from Delhi) together secured 6 votes in Round 3.

51. 3   If Priyanka received 2 votes in round 3, then Payal would have received 4 votes in round 3, because both of them together received 6 votes in round 3.

52. 1   Pooja was the person with the highest votes at the end of round 2.

53. 2   If Priti received 3 votes in round 3 and Payal received 50% of the remaining votes which is 5, then Pooja received 4 votes in round 3 while Priyanka received 1 vote in round 3. Therefore, option 2 is definitely true i.e. Priyanka received the minimum number of votes in round 3.

54. 4   Priti and Poonam are the 2 contestants who received the minimum number of votes (1 each) in round 1.

55. 3   If Priti received an additional vote in round 3, she would have a total of 2 votes. Which means that Pooja would receive 5 votes in round 3 (total votes received by both of them together being 7). Further the total votes received by Payal and Priyanka in round 3 is 6.
Option (1) can be true because Payal can receive either 0 or 1 or 2 votes in round 3.
Option (2) can be true because Priyanka can receive either 5 or 6 votes in round 3.
Similarly, option (5) can be true because Payal could have received 5 or 6 votes in round 3.

Also at the end of the round 3, the total no of known votes is as follows :
Pooja : 3 + 5 + 5 = 13
Payal : 4 + 3 = 7 (round 3 not included)
Priti : 1 + 1 + 2 = 4
Priyanka : 2 + 3 = 5 (round 3 not included)
Therefore in any situation, Priti cannot win any of the titles. Therefore, option (3) is definitely false.

For questions 56 to 60:
The total marks obtained by the students and their overall ranks are tabulated in the following table:

NAME	Gender	Center	Rank	Total	NAME	Gender	Center	Rank	Total
Dennis	M	IV	17	40	**Sagarika**	F	I	16	41
Preeti	F	V	24	36	**Manish**	M	IV	12	44
Anurag	M	IV	19	38	**Nitya**	F	V	27	33
Pronab	M	IV	6	50	**Aditi**	F	III	20	38
Abishek	M	III	5	52	**Avni**	F	II	10	46
Shefali	F	II	23	36	**Anshul**	M	I	18	39
Reema	F	I	29	27	**Sachin**	M	II	25	34
Rahul	M	V	4	53	**Nidhi**	F	III	26	33
Rohit	M	IV	11	44	**Saurav**	M	III	13	43
Jeevika	F	III	7	49	**Anya**	M	IV	14	43
Sharanya	F	II	15	42	**Gaurav**	M	V	30	22
Arjun	M	V	3	53	**Sunil**	F	IV	22	37
Akshay	M	V	8	47	**Deepali**	F	V	28	28
Vidya	F	III	1	55	**Salim**	M	III	9	47
Tarun	M	I	2	54	**Sanjay**	M	II	21	38

56. 3   Rank of Nidhi is 26.

57. 3   Ten male students namely Saurav, Manish, Tarun, Akshay, Arjun, Rohit, Abishek, Pronab, Anurag and Dennis satisfy the condition given in the question.

58. 2   Two female students namely Preeti and Shefali have obtained more marks than two male students namely Gaurav and Sachin and more marks than four female students namely Reema, Nitya, Nidhi and Deepali.

59. 5   Overall rank of Rohit is 11 and center rank of Rohit is 2. Therefore, the required difference is 11 – 2 = 9.

60. 1   From center IV, five students namely Dennis, Pronab, Rohit, Manish and Anya have obtained at least a total of 40 and at most a total of 54 marks.

For questions 61 to 65:
From the conditions provided in the question, the following table can be constructed.

	Pan Pasand	Mango Bite	Eclairs	Minto Fresh	Coffee Bite	Candy Man
A	1		3			
B						
C				X	4	
D		X				4
E						
F					X	X

From condition II, the only possible value of number of Pan Pasand, Mango Bite, Eclairs and Minto Fresh with F, is 1, 3, 3, 3 which satisfies the given condition. Hence, B, C, D and E must have 1 Eclairs each. From condition VII, the only perfect number to be formed with the given values is 6 (1 + 2 + 3 = 6) which implies that number of Pan Pasand with B and C can be (1, 4) or (4, 1).
E already have 7 toffees (distributed among Eclairs, Minto Fresh, Cofee Bite and Candy Man). So E cannot have 3 Mango Bite

which implies that E has 2 Mango Bite. Using this information we can say that E has 1 Pan Pasand. So we can construct three possibilities in the following tables:

Case I:

	Pan Pasand	Mango Bite	Eclairs	Minto Fresh	Coffee Bite	Candy Man	Total
A	1	2	3	2	1	1	10
B	1	2	1	2	2	2	10
C	4	1	1	0	4	0	10
D	2	0	1	2	1	4	10
E	1	2	1	1	2	3	10
F	1	3	3	3	0	0	10
Total	10	10	10	10	10	10	

Case II:

	Pan Pasand	Mango Bite	Eclairs	Minto Fresh	Coffee Bite	Candy Man	Total
A	1	2	3	2	1	1	10
B	1	2	1	2	2	2	10
C	4	1	1	0	4	0	10
D	2	0	1	1	2	4	10
E	1	2	1	2	1	3	10
F	1	3	3	3	0	0	10
Total	10	10	10	10	10	10	

Case III:

	Pan Pasand	Mango Bite	Eclairs	Minto Fresh	Coffee Bite	Candy Man	Total
A	1	2	3	1	2	1	10
B	1	2	1	2	2	2	10
C	4	1	1	0	4	0	10
D	2	0	1	2	1	4	10
E	1	2	1	2	1	3	10
F	1	3	3	3	0	0	10
Total	10	10	10	10	10	10	

61. 4   Statements 1, 2 and 3 are false.

62. 2   Number of Pan Pasand with C = 4
Number of Mango Bite with A = 2
Required answer = 4 + 2 = 6

63. 5   Number of Pan Pasand with E = 1
Number of Coffee Bite with A = 1 or 2
So, Difference = 0 or 1
Hence, the answer cannot be determined.

64. 2   Number of Coffee Bite with C = 4
Number of Candy Man with B and E = 2 + 3 = 5
Required answer = 5 – 4 = 1

65. 2   Mango Bite with E is greater than number of Pan Pasand with B.
So only statement 2 is true.
Other statements are definitely false.

For questions 66 to 70:
Let us represent the names of the shooters with the starting alphabet of their names.
Let us represent the different Academies with subscript A to the alphabet with which they start.
From the mother data we have the following conclusions:

$A_A \neq Multi-barelled$

$M \neq Revolver, AR-15$

$M \neq A_A, T_A$

$T \neq Multi-barelled, Revolver$

$R \neq M_A$

$S \neq M_A$

$S \neq Multi-barelled, TAC-50$

$R_A \neq Sniper$

We can start solving this set from condition III. Tanveer is not specialised in either Multi-barreled Pistol or Revolver. He cannot specialise in TAC-50 Rifle because it starts with the letter 'T'. Also, since Tanveer belongs to Sierra Academy, he cannot specialise in Sniper. So he must be specialised in AR-15. Similarly, from condition V, Satpal is not specialised either Multi-barreled Pistol or TAC-50 Rifle. He cannot specialise in Sniper because it starts with the letter 'S'. As Tanveer is specialised in AR-15, so Satpal must be specialised in Revolver. We can approach similarly for the other shooters.
The following is the table representing the right combinations of shooters, Academies and the gun they use.

Shooters	Raghav	Mayank	Satpal	Anant	Tanveer
Academy	Tango	Romeo	Alpha	Mike	Sierra
Gun	Multi-barreled	TAC - 50	Revolver	Sniper	AR-15

Now, we can proceed to answer the questions.

66. 5   Satpal belongs to Alpha Academy.

67. 1   Mayank specializes in TAC - 50.

68. 4   Satpal specializes in Revolver.

69. 3   The person from Tango academy is Raghav and he specializes in Multi-barelled Pistol.

70. 2   Anant specializes in Sniper rifles.

For questions 71 to 75:

Since, the number of stall selling sweets was less than the number of stalls selling Namkeen and it is also known that Mirch Masala had only sweets, so the number of stalls where Namkeen items are sold must be 3 and that of sweet items must be 2. Since, Mirchi Rasoi had more namkeen items to offer than Hi-Mirchi and since Hi-Mirchi did not have any sweet to offer and also P is not sold at the stall which had maximum items to offer therefore P and Q are sold at Hi-Mirchi and Mircheez respectively.

So, K, L, M, N and O must be sold at Mirchi Rasoi. Mircheez must therefore have the rest of the sweet items.
The following table represents the items purchased from different stalls along with their prices given in the bracket.

Hi-Mirchi	P (6)						
Mircheez	Q (7)	R (8)	S (9)	T (10)	U (11)	W (13)	X (14)
Mirch Masala	V (12)	Y (15)	Z (16)				
Mirchi Rasoi	K (1)	L (2)	M (3)	N (4)	O (5)		

71. 5   Choice of Q, T, L, O requires a payment of Rs. 24.
Choice of Q, R, W, O requires a payment of Rs. 33.
Choice of S, U, W, O requires a payment of Rs. 38.
Choice of X, L, N, O requires a payment of Rs. 25.
Hence, the correct option is (5).

72. 3   Clearly from the table the payment made to Hi-Mirchi, Mircheez, Mirch Masala, Mirchi Rasoi are 6, 72, 43 and 15 respectively.
So, the required percentage difference

$$= \left(\frac{21}{72} - \frac{15}{115} \right) \times 100 = 16.12\%$$

73. 2   Obviously, from Mircheez Rinku has purchased Q and R and he needs (72 – 7 – 8) = 57 more from his friend. The amount already spent by Rinku on the rest of items that he has already purchased = (15 + 6 + 43 + 15) = 79

Hence, the required percentage = $\frac{57}{79} \times 100 = 72.15\%$

74. 3   Clearly, the amount required at Hi-Mirchi = Rs. 6
At Mircheez in order to minimise the payment, Rinku should purchase Q and R and then choose X as the free item.
Then, he should purchase S and T and then choose W as the free item.
And lastly he should purchase U.
So, the minimum amount requied at Mircheez
= 7 + 8 + 9 + 10 + 11 = 45
Clearly, the minimum amount required at Mirch Masala
= 12 + 15 = 27
At Mirchi Rasoi the minimum amount required
= 1 + 2 + 3 + 4 = 10
Hence, total minimum amount required
= 6 + 45 + 27 + 10 = 88

75. 1   The pair-wise differences between the number of items of any two stalls are 6, 2, 4, 4, 2 and 2.
Clearly, the maximum distinct pair of stalls having same value for D occurs for D = 2 and the maximum value is 3.
Clearly, the minimum distinct pair of stalls having same value for D occurs for D = 4 and the minimum value is 2. Hence, the absolute difference is |3 – 2| = 1