# Mock CAT - 11

# Answers and Explanations

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 4 | **2** | 2 | **3** | 3 | **4** | 4 | **5** | 3 | **6** | 3 | **7** | 3 | **8** | 3 | **9** | 3 | **10** | 2 |
| **11** | 2 | **12** | 3 | **13** | 4 | **14** | 2 | **15** | 1 | **16** | 4 | **17** | 3 | **18** | 1 | **19** | 4 | **20** | 5 |
| **21** | 2 | **22** | 4 | **23** | 2 | **24** | 4 | **25** | 3 | **26** | 2 | **27** | 2 | **28** | 4 | **29** | 3 | **30** | 4 |
| **31** | 3 | **32** | 5 | **33** | 4 | **34** | 3 | **35** | 2 | **36** | 3 | **37** | 2 | **38** | 4 | **39** | 3 | **40** | 4 |
| **41** | 4 | **42** | 3 | **43** | 1 | **44** | 4 | **45** | 4 | **46** | 3 | **47** | 5 | **48** | 4 | **49** | 3 | **50** | 2 |
| **51** | 5 | **52** | 1 | **53** | 4 | **54** | 5 | **55** | 2 | **56** | 5 | **57** | 1 | **58** | 4 | **59** | 5 | **60** | 3 |
| **61** | 2 | **62** | 3 | **63** | 5 | **64** | 2 | **65** | 4 | **66** | 1 | **67** | 3 | **68** | 2 | **69** | 5 | **70** | 2 |
| **71** | 5 | **72** | 2 | **73** | 3 | **74** | 1 | **75** | 2 | **76** | 2 | **77** | 4 | **78** | 3 | **79** | 4 | **80** | 1 |
| **81** | 4 | | | | | | | | | | | | | | | | | | |

| MY PERFORMANCE | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Total Questions | Time Taken (Min) | Total Attempts | Correct Attempts | Incorrect Attempts | Net Score |
| Language Comprehension and English Usage | Section I | 27 | | | | | |
| Quantitative Ability | Section II | 27 | | | | | |
| Logical Reasoning based Data Interpretation | Section III | 27 | | | | | |
| **TOTAL** | | **81** | **150** | | | | |

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**MCT-0011/07**

1. 4 Option 4 effectively follows what is being stated in the paragraph because it provides further example of how people prefer to watch reality movies and appreciate them more especially in a situation where their real lives do not contain much of actuality.

2. 2 The paragraph states that fear has no evidence, option 2 takes this forward.

3. 3 The paragraph is chiefly concerned with the engineering design, making option 3 the correct answer.

4. 4 Option 4 is the extension of the subject of concern in the paragraph; the topic gets manifested in the aspect of culture also.

5. 3 The opposite effect of speed is to slow down, option 3 talks about this effect making it the correct answer.

6. 3 Statement 1 is a fact as it can be verified whether Michael stated it. Statement 2 is an inference – a conclusion about the reason for seeking police protection based on the facts – marriage and seeking police protection. Statements 3 and 4 are opinions expressing approval/disapproval – hence judgements.

7. 3 Statements 1, 2 and 4 are judgements as they are individual opinions. Statement 3 is an inference as it is a conclusion about the unknown-the expected impact of the reduction in the interest rates based on the fact that reduction has occurred.

8. 3 The first statement in the question talks about a growing trend which has happened in reality. Hence the correct order starts with a factual statement. Therefore Options (2), (4), (5) can be eliminated by determining the nature of the first statement. The 2nd statement is an inference because it is a conclusion based on the known - the traffic control drive. The 3rd statement is a fact because it can be proved that the government has taken this decision. The last statement is also a fact because it can be proved that Salman Rushdie has been awarded the Booker prize. Hence, Option (3) is the correct answer.

9. 3 GECBDFA. G is a better opening sentence than C. It is a more generalized sentence. It speaks about any intelligent person and is correctly followed by E (any organization, individual). The paragraph then specifically talks about the value of the principle for a manager, hence C. BD is a mandatory pair and is followed by statements F and A.

10. 2 EDAGFCB. ED is a mandatory pair and opens the paragraph. A speaks about HRM and is followed by G. F and C talk about the global nature of HRM. B concludes the paragraph.

11. 2 (i) is a lateral argument that supports the premise of the passage that investors choose risky investments if they expect high returns. Since Mr Nair is nearing retirement he is investing in low risk instruments with low returns (fixed interest). (ii) is a downstream argument. From the passage it would follow that the higher the risk profile of an investment the higher would be the returns expected from it, i.e. the two are directly proportional to each other. (iii) draws a comparison between speculators and regular investors and is thus irrelevant to the passage. (iv) is an upstream argument because it states a case where a new (therefore risky) venture failed to attract investors because the expected returns were too low. The passage follows as a logical conclusion from it.

12. 3 (i) is a downstream argument because it illustrates how unpredictable the reaction of present systems to a meteorite blast similar in its effect to a nuclear attack can be. (ii) is an upstream argument because it mentions that scientists are searching for a system that reacts in a predictable manner. The fact that present systems respond in an unpredictable manner follows from this. (iii) talks in general about expenditures being incurred in upgrading missile defence systems. Therefore it supports the passage and is a lateral argument. (iv) talks in general about the arms race (not nuclear attacks specifically) and is irrelevant to the passage.

13. 4 (i) brings up the issue of daylight driving versus night driving and is irrelevant to the argument. (ii) is an upstream argument because it establishes the reason why countries located far from the equator have daylight driving laws. (iii) talks in general about how appropriate laws help avoid automobile accidents and thus supports the passage and is a lateral argument. (iv) is a downstream argument because it is a conclusion one can logically draw from the passage.

14. 2 The author is merely suggesting the range of things encompassed and influenced by manners. It is literally impossible for him to be exhaustive. Option (2) is correct.

15. 1 Refer to last line, 2nd last paragraph.

16. 4 From the third paragraph of the passage option 4 can be easily inferred.

17. 3 Option (1) is ruled out. Option (2) is not a case of interchangeable terms, even though social polish as Col. Mann says is a cover of vice. But Mann did excoriate the high and mighty, the gilded class that he stealthily invaded. Hence Option (3) is correct.

18. 1 Options (3) and (4) are ruled out. Option (3) could at best be a small sideshow and option (4) talks of a variety not even hinted at by the author as he tells us of Mathew's fine effort. Option (2) is very broad, the operative logic behind the main point. Option (1) is the main theme of the passage.

19. 4 Refer to the second sentence of the seventh para. Hence option (4) is correct.

20. 5 The third last and the second last paragraph lead to option (4) as the best option. The other options are incomplete or irrelevant.

21. 2 The author provides experimental evidence in the passage to question the 'central dogma' theory.

22. 4 The third sentence in the sixth paragraph tells us that the author's primary concern is that actual experimental observations deny the assumptions of scientific theory. Hence option (4) is correct.

23. 2 Refer to the last three sentences of the sixth para. Hence option (2) is correct.

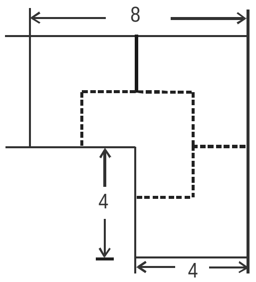
24. 4 From the third paragraph it can be seen that political and economic forces determine the individual's social being - which determines consciousness - hence option (4) can be inferred. The other options are incorrect.

25. 3 Refer to the second last paragraph of the passage.

26. 2 Option (2) is nowhere mentioned in the passage, the other options are explicitly mentioned.

27. 2 The passage talks about Marx's views and theory and then turns to comment on literature. Hence option (2) is best.

28. 4




Perimeter of one of the parts that was cut = 4×2+2×4 = 16 cm

29. 3 10 could be the maximum possible HCF in the given condition. Only two pairs (20, 30) and (10, 40) will have an HCF of 10.

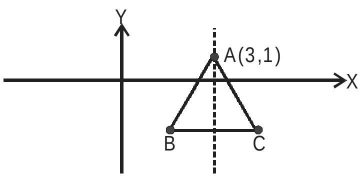
30. 4 60% men $\Rightarrow$ 40% women. 20% of the women are literate.
$\Rightarrow$ 40% of 20% = 8% population is literate women
Total literate population = 12%
$\Rightarrow$ 4% population is literate men
$\Rightarrow \frac{60\% - 4\%}{60\%} \times 100 = 93.33\%$ of the men are illiterate.

31. 3 Assume the numbers be a, b, c.
Then ab + bc + ca = 11. If sum of the numbers is constant then their product will be maximum, when they are equal.
So for the maximum value of ab × bc × ca, ab = bc = ca = $\frac{11}{3}$
The maximum value of abc = $\left(\frac{11}{3}\right)^{\frac{3}{2}}$

32. 5 **Case 1:** 3 students get 1 book each and other two get none.
This can be possible in $\frac{5!}{3! \times 2!}$ = 10 ways
**Case 2:** One particular student gets 2 books, another student gets 1 book and the rest of the students get none.
This can be possible in $\frac{5!}{3!}$ = 20 ways
Total number of ways = 10 + 20 = 30

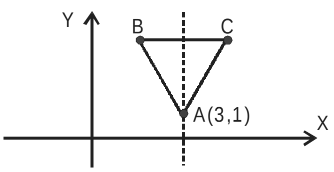
33. 4 Height of $\Delta ABC = \frac{\sqrt{3}}{2} \times 2\sqrt{3} = 3$ units

**Case I:**




Co-ordinates of $B = (3 - \sqrt{3}, -2)$
Co-ordinates of $C = (3 + \sqrt{3}, -2)$

**Case II:**




Co-ordinates of $B = (3 - \sqrt{3}, 4)$
Co-ordinates of $C = (3 + \sqrt{3}, 4)$
In each of these 2 cases, the co-ordinates of points B and C could interchange.
Hence, option (4) is the correct choice.

34. 3 Here the roots are real and distinct.
So, $(-9)^2 - 4p > 0$ or $p < \frac{81}{4}$
Again $\alpha + \beta = 9$ and $\alpha\beta = p$ and $\alpha - \beta < 7$, assume $\alpha > \beta$
Now, $(\alpha - \beta)^2 < 7^2$ or $(\alpha + \beta)^2 - 4\alpha\beta < 7^2$
$81 - 4p < 7^2$ or $8 < p$. Hence $8 < p < \frac{81}{4}$

35. 2 Since $\angle ADE = \angle AED = x°$(say), therefore $\Delta DAE$ is isosceles.
In isosceles $\Delta DAE$, $\angle DAE = 180° - 2x° = 20°$.
In $\Delta AEC$: $\angle EAC + \angle ACE = \angle DEA$ (exterior angle) and $\angle EAC = \angle EAF = 20°$
Now in quadrilateral ADEF:
$\angle ADE + \angle AFE = x° + 180° - x° = 180°$
Hence, ADEF is a cyclic quadrilateral
$\angle FDC = \angle EDF = \angle EAF = 20°$ (angle subtended by a chord on the circumference of a circle is same)

36. 3 Largest sub-multiple of 840 is 420. Now 420 = $2^2 \times 3 \times 5 \times 7$
So those three numbers can be 3, 140 and 420.
So, the maximum possible sum can be 563. All the other combinations will lead to a lower sum.

37. 2 Product of the first ‘n’ terms
$\frac{6!}{3!} \times \frac{7!}{5!} \times \frac{8!}{7!} \times \frac{9!}{9!} \times \frac{10!}{11!} \ldots\ldots\ldots\ldots \frac{(n+4)!}{[n^2 - (n-1)^2]!}$
Product of the first 8 terms
$= \frac{6!}{3!} \times \frac{7!}{5!} \times \frac{8!}{7!} \times \frac{9!}{9!} \times \frac{10!}{11!} \times \frac{11!}{13!} \times \frac{12!}{15!} \times \frac{13!}{17!} < 1$
Hence, the product of first 8 terms will be less than unity.

38. 4 The two real roots of each of the possible quadratic equations will be distinct. For real roots we must have $b^2 > 4ac$.
As a, b and c distinct prime numbers from 1 to 10, only the following ordered triplets (a, b, c) are possible:
(2, 5, 3), (3, 5, 2), (2, 7, 3), (3, 7, 2), (2, 7, 5), (5, 7, 2).
Accordingly, the sum of roots of all such formed is $= -\frac{5}{2} - \frac{5}{3} - \frac{7}{2} - \frac{7}{3} - \frac{7}{2} - \frac{7}{5} = -\frac{149}{10}$.

39. 3 $2470^{1613} = 247^{1613} \times 10^{1613}$. The second right most non-zero digit in the number would be the digit at the ten’s place of the number $247^{1613}$.
$\frac{247^{1613}}{100} = \frac{247^{1613}}{4 \times 25}$
The remainder when $247^{1613}$ is divided by 4 is 3.
So, $247^{1613} = 4k + 3$.
Now we need to find the remainder when $247^{1613}$ is divided by 25.
$\frac{247^{1613}}{25} = \frac{(250-3)^{1613}}{25}$
$R = \frac{-3^{1613}}{25} = \frac{-3^3 \times (3^{10})^{161}}{25} = \frac{-27 \times (59049)^{161}}{25}$
Therefore the remainder is 2. So, $247^{1613} = 25n + 2$.
$4k + 3 = 25n + 2$. Therefore, $k = 25m - 19$.
$247^{1613} = 4(25m - 19) + 3 = 100m - 73$.
So the remainder when 100m – 73 is divided by 100 is 27.
So, the second right most non-zero digit in the number $N = 2470^{1613}$ is 2.

40. 4

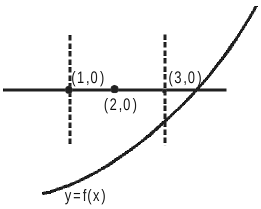



**Figure i**

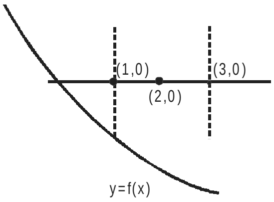



**Figure ii**

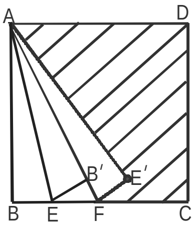
Since, f(1) × f(2) × f(3) < 0 and f(2) < 0, therefore f(1) as well as f(3) have to be less than 0. Therefore, the only value of x out of the options given in the questions is $\sqrt{5}$, for which f(x) can never be zero.

41. 4 The number of possibilities is listed down in the following table.

| First Number | Second Number | First Number | Second Number |
|---|---|---|---|
| 1 | 2 or 5 or 8 or 14 | 7 | 8 or 11 or 14 |
| 2 | 4 or 7 or 13 | 8 | 10 or 13 |
| 3 | 6 or 12 or 15 | 9 | 12 |
| 4 | 5 or 11 or 14 | 10 | 11 |
| 5 | 10 or 13 | 12 | 15 |
| 6 | 9 or 12 or 15 | 13 | 14 |

Total number of ways in which the two numbers can be selected = 27.

42. 3




Let the length of B′F and EF be ‘x’ cm and ‘y’ cm respectively.
Also, B′E = BE = 1 cm.
In triangle ABF : $AB^2 + BF^2 = AF^2$

$\Rightarrow (y+1)^2 + 4^2 = (4+x)^2$

$\Rightarrow (y+1)^2 = x^2 + 8x$ ... (i)

In triangle EB′F : $EB'^2 + B'F^2 = EF^2$

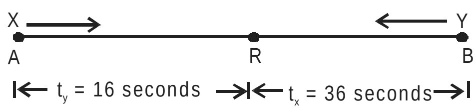
$\Rightarrow y^2 = 1 + x^2$ ...(ii)

Solving (i) and (ii) we get that $x = \frac{8}{15}$ and $y = \frac{17}{15}$

Area of the shaded region = Area of the square ABCD – (Area of the triangle ABE + 2 × Area of the triangle AEF)

$$= 16 - \left(\frac{1}{2} \times 1 \times 4 + 2 \times \frac{1}{2} \times \frac{17}{15} \times 4\right) = \frac{142}{15} \text{ cm}^2$$

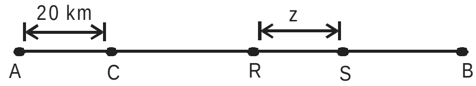
43. 1




Let speed of X be a km/hr and that of Y be b km/hr. X and Y start simultaneously from A and B respectively to reach R.

$$\frac{a}{b} = \sqrt{\frac{16}{36}} = \frac{2}{3} \Rightarrow \frac{AR}{RB} = \frac{2}{3}$$

Let AR = 2k BR = 3k
When Y starts late; X had already covered a distance of 20 km, to reach C. This time both of them meet at a point S.
Let the distance RS be z km.




After X reaches C, Y is still at B. We can assume that X and Y start their respective, journeys to meet at point S.

We have $\frac{CS}{BS} = \frac{2}{3}$

or, $\frac{(AR - AC) + RS}{BR - RS} = \frac{2}{3}$ or, $\frac{(2k - 20) + z}{3k - z} = \frac{2}{3}$

$\Rightarrow 6k - 60 + 3z = 6k - 2z$

$\Rightarrow 5z = 60$

$\Rightarrow z = 12$ km. Hence, (1) is correct.

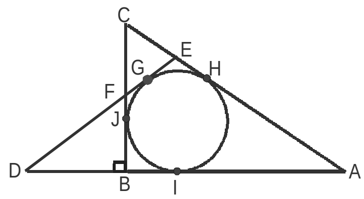
44. 4 Let x, y and z be the number of pencils, rubbers and pens bought. The cost of one pencil, one rubber and one pen is Rs.2, Rs.3 and Rs.4 respectively.
Now, 2x + 3y + 4z = 45.

$\Rightarrow x = \frac{(45 - 3y - 4z)}{2}$

Also, $z < \frac{45 - 3y - 4z}{2} < y$

Or, 6z + 3y < 45 and 5y + 4z > 45.
Possible values of y and z that satisfy the above equation is (7, 3); (9, 2) and (11, 1) in that order.
Therefore, there are 3 different possible combinations.

45. 4




$AB^2 + BC^2 = AC^2 \Rightarrow AB = 12$ cm
AH = AI, BI = BJ and CJ = CH
$\Rightarrow$ 13 – AH = 5 – BJ $\Rightarrow$ AH – BJ = 8 cm
AI + BI = AH + BJ = 12 cm
AH = 10 cm and BJ = 2 cm
Let, EG = y cm, BD = z cm and GF = x cm = FJ.
DG = DI $\Rightarrow$ 7 – y = z + 2 $\Rightarrow$ y = 5 – z
In triangle DBF : $DB^2 + BF^2 = DF^2$

$\Rightarrow z^2 + (2 + x)^2 = (7 - x - y)^2 = (2 + z - x)^2$

$\Rightarrow x = \frac{2z}{z+4}$

$\therefore GF = \frac{2BD}{BD + 4}$

Therefore, k = 4.

**For questions 46 and 47:**
Let ABC be the three-digit number.
A + B + C = 5k, where ‘k’ is a natural number.
Also, C = 3A

4A + B = 5k. Therefore, $A = \frac{1}{4}(5k - B)$

If k = 1, then B = 1, A = 1 and C = 3 or B = 6, A = 1 and C = 3.
Three-digit number can be 113 or 163

If k = 2, then B = 2, A = 2 and C = 6. Three-digit number can be 226.
If k = 3, then B = 3, A = 3 and C = 9 or, B = 7, A=2 and C = 6. Three-digit number can be 339 or 276.
If k = 4, then B = 8, A = 3 and C = 9. Three-digit number can be 389.

46. 3 There are 4 digits (0, 4, 5 and 9) which cannot be the digit at the ten's place of the three-digit number.

47. 5 Remainder when 113, 163, 226, 276, 339, 389 are divided by 17 are 11, 10, 5, 4, 16 and 15.
So, 9 cannot be a possible reminder when such a three-digit number is divided by 17.

48. 4 It is given that $f(k) = 1 - k + k^2 - ... - k^{17}$.

$$\Rightarrow 1 - k + k^2 - k^3 + ....... - k^{17} = \frac{1-k^{18}}{1+k}$$

$$\Rightarrow \frac{1-k^{18}}{1+k} = \frac{1-(m-1)^{18}}{m}, \text{ for } m = k + 1.$$

The coefficient of $m^3$ in $1 - (m - 1)^{18} = {}^{18}C_3 = 17 \times 48 = 816$, which will be the coefficient of $m^2$ in $\frac{1-(m-1)^{18}}{m}$

49. 3 The series can be rewritten as:
$1^2 + 2^2, -(2^2 + 3^2), 3^2 + 4^2, -(4^2 + 5^2), 5^2 + 6^2, -(6^2 + 7^2)$
Now for $T_1 + T_2 + ....... T_n > 0$
$T_n$ has to be positive.
In this case $T_1 + T_2 + ........... T_n = 1^2 + (n + 1)^2$
Hence, $1^2 + (n + 1)^2 > 901$
$\Rightarrow n \geq 30.$
Least possible value of n is 31 because the 30th term is negative and $1^2 + (n + 1)^2 \geq 901$ is only true for odd n.

50. 2 Here $a + (n - 1) d - a = 2 \Rightarrow d = \frac{2}{(n-1)}$
The sum of all the even placed terms
$= (a + d) + (a + 3d) + . ...= 7$ …(i)
The sum of all the odd placed terms
$= a + (a + 2d) + . ...= 8.75$ …(ii)
Subtracting equation (i) from (ii), we get

$$a + \left[d + d + ... \frac{(n-1)}{2} \text{terms}\right] = 1.75 \Rightarrow a + d \times \frac{(n-1)}{2} = 1.75$$

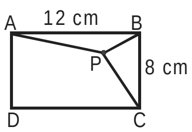
We know that $d = \frac{2}{n-1}$
$\therefore a + 1 = 1.75$ or $a = 0.75$
$\therefore$ The last term is 2.75

$\therefore$ Sum of the n terms of the AP $= \frac{n}{2}$ [First term + Last term] = 15.75

$= \frac{n}{2}$ [0.75 + 2.75] = 15.75

$\Rightarrow n = 9$

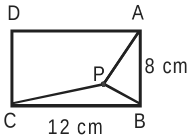
51. 5 **Case I:**




The point P can be outside the rectangle also.
Let, PA = 3x and PB = x.

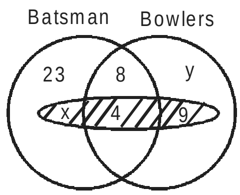
In $\Delta APB: AP + PB > AB \Rightarrow 3x + x > 12 \Rightarrow x > 3$
Also, $x + 12 > 3x \Rightarrow 2x < 12 \Rightarrow x < 6$
$\therefore 3 < x < 6$ ...(i)
Let, PC = kx
In $\Delta PBC: PB + PC > BC \Rightarrow (k+1)x > 8 \Rightarrow k : \frac{8}{x} - 1$
Also, $PB + BC > PC \Rightarrow x + 8 > kx \Rightarrow k < \frac{8}{x} + 1$
$\Rightarrow \frac{8}{x} - 1 < k < \frac{8}{x} + 1$ ...(ii)
Using (i) and (ii) we get that $\frac{1}{3} < k < \frac{11}{3}$

**Case II:**




The point P can be outside the rectangle also.
Proceeding as in the previous case we get that 2 < x < 4 and
$\frac{12}{x} - 1 < k < \frac{12}{x} + 1$
Now, 2 < k < 7
Now, combining all the range of values of 'k' we get that
$\frac{1}{3} < k < 7$
Only option (5) does not lie within the permissible limits.

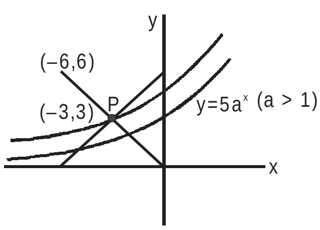
52. 1 The solution set can be designed as in the figure given below.




Shaded region denotes the players in category A and the unshaded region denotes the players in category B.
Now, x + y = (72 – 23 – 8 – 4 – 9) = 28
Also, $\frac{2}{3} \leq \frac{4+x}{8+y} \leq 1$
Values of (x, y) that satisfy the above equation are (12,16), (13,15), (14,14), (15,13) and (16,12).
Possible number of batsmen in category A can be 16, 17, 18, 19 or 20.
Hence, 15 can never be the number of batsmen in category A.

53. 4 Minimum possible number of batsmen in category A = 16.
Number of ways in which the team can be selected
$= {}^{12}C_3 \times {}^{9}C_4 \times {}^{4}C_4 = 27720$

54. 5 The given system of equations can be represented in the x-y plane as shown in the figure given below.



Clearly the value of $5a^x$ at x = 0 is 5.
Now there are two cases one in which the curve $5a^x$ passes through P and one in which it does not.
When it passes through P we get minimum possible number of solutions, i.e. 1, while in the other case when it does not passes through P, we get maximum possible number of solutions, i.e. 2.

**For questions 55 to 58:** The absolute and percentage variation of the shares are as follows :

| Company | Share prices as on 5th June 2006 | Share prices as on 5th June 2007 | Absolute variation | % variation |
|---|---|---|---|---|
| A | 150 | 230 | 80 | 53.3% |
| B | 500 | 575 | 75 | 15.0% |
| C | 200 | 320 | 120 | 60.0% |
| D | 400 | 440 | 40 | 10.0% |
| E | 800 | 900 | 100 | 12.5% |
| F | 175 | 245 | 70 | 40.0% |

55. 2 The two Telecom companies showed the highest absolute variation. Therefore C and E must be the two Telecom companies. Also, the two Insurance companies showed the lowest absolute variation. Therefore D and F must be the two Insurance companies which means that A and B must be the two Retail companies.
The total change will be from a combined share price of (150 + 500) to a combined share price of (230 + 575) i.e from Rs. 650 to Rs. 805.

$$\text{Percentage change } = \frac{(805 - 650)}{650} = \left(\frac{155}{650}\right) \times 100$$
$$= 24\% \text{ (approx.)}$$

56. 5 Chintamani had purchased 60 shares across 4 companies and we need to calculate the maximum percentage return. This is possible if he had purchased 30 shares giving the maximum percentage return i.e. of company C and minimum 10 shares each of the remaining 3 companies providing the next higher percentage returns i.e 10 shares each of companies A, F and B.
Initial Value of shares purchased
30 × 200 = Rs. 6000
10 × 150 = Rs. 1500
10 × 175 = Rs. 1750
10 × 500 = Rs. 5000
Total Value = Rs. 14250
Final values of the shares purchased
30 × 320 = Rs. 9600
10 × 230 = Rs. 2300
10 × 245 = Rs. 2450
10 × 575 = Rs. 5750
Total value = Rs. 20100

$$\text{Therefore percentage change } = \frac{(20100 - 14250)}{14250} = 41\%$$

57. 1 One of the two Telecom companies showed the highest percentage variation and the other Telecom company showed the lowest percentage variation. Therefore the two Telecom companies are C and D.
Initial combined share price = 200 + 400 = Rs. 600
Final combined price = 320 + 440 = Rs. 760

$$\text{Percentage change } = \frac{(760 - 600)}{600} = 26.66\%$$

58. 4 Since we require the minimum percentage return, therefore we assume that 10 shares each of D, E, B and F was purchased.
Initial combined share price
10 × 400 = Rs. 4000
10 × 800 = Rs. 8000
10 × 500 = Rs. 5000
10 × 175 = Rs. 1750
Initial combined share price = Rs. 18750
Final combined share price
10 × 440 = Rs. 4400
10 × 900 = Rs. 9000
10 × 575 = Rs. 5750
10 × 245 = Rs. 2450

Final combined share price = Rs. 21600

$$\text{Percentage change } = \frac{(21600 - 18750)}{18750} = 15.2\%$$

**For questions 59 to 62:**
From the given table, we can calculate the following results:
AB = 3, AC = 5, AD = 2, AE = 5, AF = 3
BA = 3 × 3 = 9, BC = 6, BD = 12, BE = 9, BF = 15
CA = 25, CB = 10, CD = 25, CE = 20, CF = 15
DA = 4, DB = 8, DC = 10, DE = 2, DF= 4
EA = 25, EB = 15, EC = 20, ED = 5, EF = 10
FA = 9, FB = 15, FC = 9, FD = 6, FE = 6

59. 5 The minimum value of 2XY – YX will be obtained in the case where YX is 25. There are following possibilities:-
2 AC – CA = 10 – 25 = – 15
2 DC – CD = 20 – 25 = – 5
2 AE – EA = 10 – 25 = – 15
Clearly, the minimum value is – 15.
Option (5) is correct.

60. 3 The sum of all the values of XY taken together
= 18 + 51 + 95 + 28 + 75 + 45 = 312

61. 2 Following are the possibilities for (X, Y) such than $\frac{X}{Y} \geq 1$
(X, Y) = (B, A) (B, C) (B, E), (C, A), (C, B) (C, D) (C, E) (C, F), (D, A), (D, E), (D, F), (E, A), (E, B), (E, C), (E, D), (E, F),(F, A), (F, C), (F, D), (F, E)
Total 20 ways.

62. 3 The following are the only possibility considering the fact that Y completely divides X;

$BA + AB - \frac{B}{A} = 9 + 3 - 1 = 11$

$BE + EB - \frac{B}{E} = 9 + 15 - 1 = 23.$

$CA + AC - \frac{C}{A} = 25 + 5 - 1 = 29.$

$CD + DC - \frac{C}{D} = 25 + 10 - 1 = 34.$

$DA + AD - \frac{D}{A} = 4 + 2 - 1 = 5.$

$DE + ED - \frac{D}{E} = 2 + 5 - 2 = 5.$

$DF + FD - \frac{D}{F} = 4 + 6 - 1 = 9.$

$EA + AE - \frac{E}{A} = 25 + 5 - 1 = 29.$

$ED + DE - \frac{E}{D} = 5 + 2 - 5 = 2.$

$FA + AF - \frac{F}{A} = 9 + 3 - 1 = 11.$

$FC + CF - \frac{F}{C} = 9 + 15 - 1 = 23.$

Clearly, the third highest value is 23.

**For questions 63 to 67:**

63. 5 The average starting Rank of 6 people was 4.5 which means that the total of their ranks was 27. Now the seventh participant had a rank of 8 already. Therefore there will be no further change in the rank of this participant with any further interaction. Also given that after the interaction with Kuldeep, the average rank of the 7 contestants was 5, which means that the total was 35 which in turn would happen just because of the seventh contestant with personality rank of 8 joining in. That means that the interaction with the seventh contestant had no change on the personality rank of Kuldeep.

Therefore, we are looking for a person with whom Kuldeep should not have any change in personality rank after an interaction. As per the given data, there are 2 people who could be the seventh person (Lalchand and Radha) and therefore the answer is cannot be determined.

64. 2 If Radha ended as Insensitive personality type after exactly two interactions, and we need to find her lowest possible initial rank, then we should know the maximum change in Radha's possible rank after two interactions. From the Table, the Maximum change possible in Radha's Rank after two interactions will be a change of 3 ranks after an interaction with Lalchand and a change of 2 ranks after an interaction with either Shiv or Rajinder or Sharma. Total Maximum change possible = 5 ranks. Therefore the minimum rank that Radha could have started with was Rank 2 which is 'Lonely Empathetic'.

65. 4 For maximum change to be possible, we need to look at the interactions with the maximum change among the contestants which will be as follows:
A change of 8 ranks after an interaction between Ashish and Rajinder.
A change of 7 ranks after an interaction between Shiv and Rajinder .
A change of 6 ranks after an interaction between Ashish and Shiv.
Therefore maximum change in ranks = 8 + 7 + 6 = 21 and when divided by 6 the maximum average change in rank of the 6 contestants will be 3.5

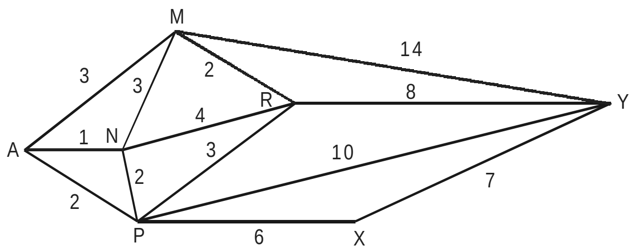
66. 1 A person started as a 'Lonely Empathetic' personality and after two interactions had become an effective personality i.e a change of 6 rank points in two interactions. For Shradha, the maximum change possible in two interactions is equal to 5. Therefore this person cannot be Shradha. It is possible for all the other participants among the given options.

67. 3 The total change after the interactions will be as follows :
i. Rajinder and Shradha : change = 1 + 1 = 2 ranks
ii. Shiv and Radha : change = 2 + 3 = 5 ranks
iii. Sharma and Kuldeep : change = 4 + 2 = 6 ranks

Total change = 13 ranks.
Previous total = 27 ranks.
New total = 27 + 13 = 40 ranks.

Average rank = $\frac{40}{6}$ = 6.66

**For questions 68 to 72:**
From the given data, we can construct the following network diagram:




In the above diagram distance in nano-meter is given along side every path.

68. 2 The longest path from 'P' to 'R' is 12 *nm*. The signal must have traced P-A-M-N-R. So, 3 intermediate nodes.

69. 5 The path X-P-R-N-A-M-Y will give the longest distance of 31 *nm*.

70. 2 If no signal can pass through the node 'P', then the signal must trace the path A-N-R-Y. Total length will be 1 + 4 + 8 = 13 *nm* in that case.

71. 5 If the signal traces the path N-M-R-Y, then the length of the path will be 13 *nm*, and the time taken will be 2.6 mili-second. So, option (1) is possible.
If the signal traces the path N-A-M-R-Y, then the length of the path will be 14 *nm*, and the time taken will be 2.8 mili-second. So, option (2) is possible.
If the signal traces the path N-M-A-P-Y, then the length of the path will be 18 *nm*, and the time taken will be 3.6 mili-second. So, option (3) is possible.
If the signal traces the path N-R-M-A-P-Y, then the length of the path will be 21 *nm*, and the time taken will be 4.2 mili-second. So, option (4) is possible.
Only option (5) is not possible.

72. 2 Case I, case III and case IV will not get affected, because those paths do not pass through 'N'.

**For questions 73 to 77:**

73. 3 Let the marks secured by A in Physics III paper, E in Physics I paper and H in Physics III paper be x, y and z respectively. Also assume that average marks scored by them in Physics test is p, q and r respectively.

or, $p = \frac{(25 + x)}{3}$, $q = \frac{(22 + y)}{3}$ and $r = \frac{(26 + z)}{3}$

Possible combinations for 'x' and its corresponding value of 'p' are

| x | 2 | 5 | 8 | 11 | 14 | 17 |
|---|---|---|---|---|---|---|
| p | 9 | 10 | 11 | 12 | 13 | 14 |

Similarly, the possible combinations for 'y' & 'q' and 'z' & 'r' are as follows

| y | 2 | 5 | 8 | 11 | 14 | 17 |
|---|---|---|---|---|---|---|
| q | 8 | 9 | 10 | 11 | 12 | 13 |

| z | 1 | 4 | 7 | 10 | 13 | 16 | 19 |
|---|---|---|---|---|---|---|---|
| r | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

But, average of Physics I paper is 16. So, the total of this paper must be 128. That means the marks secured by D and E taken together must be 31. $\therefore y \geq 14$

So, from the table shown above, possible values of 'y' are 14 and 17. Also from condition (iii) in the question, possible values of (p, r) can be (11, 11) or (13, 13). Corresponding values of 'x' and 'z' are (8, 7) or (14, 13). All possible values of x, z and y are tabulated below:

| x | z | y | x + y + z |
|---|---|---|---|
| 8 | 7 | 14 | 29 |
| 8 | 7 | 17 | 32 |
| 14 | 13 | 14 | 41 |
| 14 | 13 | 17 | 44 |

Hence 35 is never possible.

74. 1 Let the average marks secured by A, F and H in Chemistry be x, y and z respectively. Also assume that marks secured by A in Chemistry I paper and marks secured by F and H in Chemistry III paper is p, q and r respectively.
or, $3x = 22 + p$, $3y = 38 + q$, $3z = 17 + r$
Average of S2 is 14 that means total = 112. Average marks of G in Chemistry is $\frac{19+19+4}{3} = 14$.
So, x + y + z = 112 – (9 + 15 + 16 + 16 + 14)
Or x + y + z = 42
Possible combinations for x, y and z are
x = 8, 9, 10, 11, 12, 13
y = 13, 14, 15, 16, 17, 18, 19
z = 6, 7, 8, 9, 10, 11, 12
But from condition (v) in the question, only possibility for x and z are (11, 7), (13, 7) and (13, 11).
Among the given possible values, only set of values of (x, y, z) which satisfies the given conditions is (13, 18, 11).
Hence, the sum of average marks scored by F and H
= (18 + 11) = 29.

75. 2 Average marks secured by 8 students in Physics I paper = 16
Total marks secured by 8 students in Physics I paper = 16 × 8 = 128
As we have established in the solution of Q.73, marks secured by E in Physics I paper is either 14 or 17.
Marks secured by D = (128 – 111) = 17 or (128 – 114) = 14
Average of S1 is 14, that means total of S1 = 112. As we have established in the solution of Q.73, possibility of average marks in Physics of
A = 11 or 13 ; E = 12 or 13; H = 11 or 13
Combining these conditions we get the possible values of average marks of D in Physics as (13, 14, 17 and 18). But D can secure either 14 or 17 in Physics I paper. Even if he secures 19 in Physics III paper, the average will not reach 18. Moreover, the average needs to be an integer also. So, the possible values can be 13 and 14.
Hence 2 is the correct choice.

76. 2 Total marks secured by F in all tests = 43 × 3 = 129
As we have established in the solution of Q.74, the average marks of F in Chemistry is 18.
Average marks secured by F in Maths = 43 – (13 + 18) = 12
Marks secured in Maths II paper = 12 × 3 – (16 + 7) = 13

77. 4 Total marks secured by G in all tests = 48 × 3 = 144
Marks secured by G in Maths III = 144 – (19 + 4 + 19 + 19 + 20 + 47) = 144 – 128 = 16
Total marks secured by 8 students in Maths III paper
= 10 × 8 = 80
Sum of marks secured by A and H in Maths III
= 80 – 56 = 24

**For questions 78 to 81:**
The total number of eggs to be delivered = 76.
Since A and D delivered total number of eggs that were multiples of 4 and have 6 factors, so the possibilities of number of eggs delivered by them together are 12, 20, 28, 32, 44, 52 and 68. If A and D had 12 eggs, so obviously B and C had delivered 64.
This can be possible in following ways
**Case I:** A + D = 12 and B + C = 64
12 → (5, 7), (7, 5)
64 → (3, 61), (5, 59), (11, 53), (17, 47), (23, 41), (41, 23), (47, 17), (53, 11), (59, 5), (61, 3)
So, total number of ways = 2 × 10 = 20 ways
Similarly, we can calculate for other cases also.
**Case II:** A + D = 20 and B + A = 56
20 → (3, 17), (7, 13), (13, 7), (17, 3)
56 → (3, 53), (13, 43), (19, 37), (37, 19), (43, 13), (53, 3)
So, total number of ways = 4 × 6 = 24 ways
**Case III:** A + D = 28 and B + C = 48
28 → (5, 23), (11, 17), (17, 11), (23, 5)
48 → (5, 43), (7, 41), (11, 37), (17, 31), (19, 29), (29, 19), (31, 17), (37, 11), (41, 7), (43, 5)
So, total number of ways = 4 × 10 = 40 ways
**Case IV:** A + D = 32 and B + C = 44
32 → (3, 29), (13, 19), (19, 13), (29, 3)
44 → (3, 41), (7, 37), (13, 31), (31, 13), (37, 7), (41, 3)
So, total number of ways = 4 × 6 = 24 ways
**Case V:** A + D = 44 and B + C = 32
44 → (3, 41), (7, 37) (13, 31), (31, 13), (37, 7), (41, 3)
32 → (3, 29), (13, 19), (19, 13), (29, 3)
So, total number of ways = 4 × 6 = 24 ways
**Case VI:** A + D = 52 and B + C = 24
52 → (5, 47), (11, 41), (23, 29), (29, 23), (41, 11), (47, 5)
24 → (5, 19), (7, 17), (11, 13), (13, 11), (17, 7), (19, 5)
So, total number of ways = 6 × 6 = 36 ways
**Case VII:** A + D = 68 and B + C = 8
68 → (7, 61), (31, 37), (37, 31), (61, 7)
8 → (3, 5), (5, 3)
So, total number of ways = 4 × 2 = 8 ways

78. 3 Clearly from the cases illustrated above, the maximum number of eggs delivered by B and C can be 64. The number of ways of getting the eggs delivered in that case is 20. (Refer case I above).

79. 4 A and C delivered 40 eggs as per the question. This is possible in the following cases:

| A | B | C | D |
|---|---|---|---|
| 3 | 19 | 37 | 17 |
| 23 | 31 | 17 | 5 |
| 11 | 19 | 29 | 17 |
| 3 | 7 | 37 | 29 |
| 37 | 29 | 3 | 7 |
| 23 | 7 | 17 | 29 |
| 29 | 13 | 11 | 23 |
| 37 | 5 | 3 | 31 |

So, total number of possibilities is 8.

80. 1 The least number of eggs that B and C can deliver = 8.
So total number of ways in this case is 8. (Refer Case VII given above).
Hence 8 ways.

81. 4 The total number of ways in which Mr. Rajnish can get the eggs delivered = 20 + 24 + 40 + 24 + 24 + 36 + 8 = 176.