T.I.M.E.
Triumphant Institute of Management Education Pvt. Ltd.

(Key and Solutions for AIMCAT1610N)

Key

SECTION – I

1. B	6. C	11. 14	16. A	21. 147	26. A	31. D
2. B	7. D	12. 72	17. C	22. B	27. 560	32. B
3. A	8. 6	13. 24	18. A	23. D	28. B	33. A
4. B	9. C	14. D	19. 15400	24. C	29. C	34. 240
5. 10.77	10. C	15. C	20. B	25. B	30. B	

SECTION – II

35. D	40. B	45. C	50. D	55. A	60. B	65. B
36. AE	41. 7.636	46. D	51. B	56. B	61. D	66. D
37. C	42. B	47. BCDEF	52. ABD	57. D	62. AC	
38. 0.588	43. B	48. B	53. D	58. 4	63. A	
39. 8.727	44. 2	49. 11	54. C	59. A	64. D	

SECTION – III

67. C	73. D	79. C	85. B	91. A	97. D
68. AD	74. D	80. B	86. D	92. C	98. A
69. B	75. C	81. A	87. C	93. C	99. B
70. C	76. B	82. C	88. A	94. A	100. C
71. A	77. C	83. D	89. B	95. D	
72. C	78. A	84. C	90. C	96. C	

Solutions

Section – I

Solutions for questions 1 to 34:

1. We first consider the lower limit of N.

We know that $\frac{2}{1} > \frac{3}{2}, \frac{4}{3} > \frac{5}{4}, \ldots \frac{398}{397} > \frac{399}{398}$ and $\frac{400}{399} > 1$

Let $N_1 = \left(\frac{3}{2}\right)\left(\frac{5}{4}\right)\ldots\left(\frac{399}{398}\right)(1)$

Now, $N_1 N = 400$. Also $N > N_1$

$\therefore N^2 > N_1 N \Rightarrow N^2 > 400$

$\therefore N > 20$.

We now consider the upper limit of N.

$N^2 = \left(\frac{2}{1}\right)^2\left(\frac{4}{3}\right)^2\left(\frac{6}{5}\right)^2 \ldots \left(\frac{400}{399}\right)^2$

Let $N_2 = \left(\frac{2}{1}\right)^2\left(\frac{3}{2}\times\frac{4}{3}\right)\left(\frac{5}{4}\times\frac{6}{5}\right)\ldots\left(\frac{399}{398}\times\frac{400}{399}\right)$

$N^2 < N_2$. Also $N_2 = (2)(400) \Rightarrow N^2 < (2)(400)$

$\therefore N < 20\sqrt{2}$, which is approximately 28.2

Hence, N lies between 20 and 30. Choice (B)

2. I. $a^b - a^{b-1} = 2$

$a^{b-1}(a-1) = 2$

since a and b are non-zero integers, the possible solutions are

$a = -1$, $b = 2/4/6$

$a = 3$, $b = 1$

so a distinct value of b is not possible

II. $a^b = ab$

Here, when b = 1, L.H.S and R.H.S are equal.

i.e., a = 2, 3, 4 .....; b = 1

(Since a and b are distinct a = b = 2 is not possible)

$\therefore$ On solving Only statement II we can get a distinct value of b Choice (B)

3. Since, the mean and the median are the same, the three observations can be taken as $x - d$, x and $x + d$.

The standard deviation of the three observations

$$\sqrt{\frac{(x-d-x)^2 + (x-x)^2 + (x+d-x)^2}{3}}$$

$$= \sqrt{\frac{d^2 + d^2}{3}}$$

$$= \sqrt{\frac{2}{3}}\, d$$

$$\Rightarrow \sqrt{\frac{2}{3}}\, d = x$$

$\therefore$ The required ratio $= \left|\frac{x-d}{x+d}\right| = \left|\frac{x - \sqrt{\frac{3}{2}}d}{x + \sqrt{\frac{3}{2}}d}\right| = \left|\frac{\sqrt{2}-\sqrt{3}}{\sqrt{2}+\sqrt{3}}\right|$

$$= \left|\frac{\left(\sqrt{3}-\sqrt{2}\right)}{\left(\sqrt{3}+\sqrt{2}\right)}\left(\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}}\right)\right|$$

$$= \left|\frac{\left(3+2-2\sqrt{2}\sqrt{3}\right)}{1}\right| = 5 - 2\sqrt{6} : 1$$ Choice (A)

4. $a = b\left(1+\frac{q}{100}\right)$

$b = a\left(1-\frac{p}{100}\right)$

$\frac{a}{b} = \left(1+\frac{q}{100}\right) = \frac{1}{\left(1-\frac{p}{100}\right)}$

$\left(1-\frac{p}{100}\right)\left(1+\frac{q}{100}\right) = 1$

$1 - \frac{p}{100} + \frac{q}{100} - \frac{pq}{100} = 1$

$q = p + pq$ ——— (1)

$c = a\left(1+\frac{p}{100}\right)\left(1-\frac{q}{100}\right)$

$= a\left(1+\frac{p}{100}-\frac{q}{100}-\frac{pq}{100}\right)$

$= a\left(1+\frac{p}{100}-\frac{p}{100}-\frac{pq}{100}-\frac{pq}{100}\right)$

$c = a\left(1-\frac{2pq}{100}\right)$

$\Rightarrow a > c$

As a and b are distinct $p \neq q \neq 0$, so $c \neq a$.

Alternative Solution:

Let $a = 125$ and $b = 100$

$\Rightarrow p = 25\%$ and $q = 20\%$

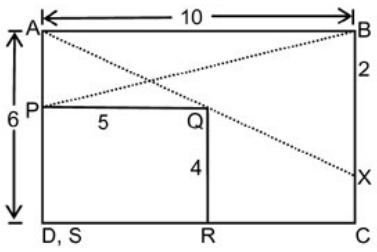
Now if a is increased by $q\%$ and decreased by $p\%$ we get $125 \times (1.2)\,(0.75) = 112.5$, i.e., less than a.

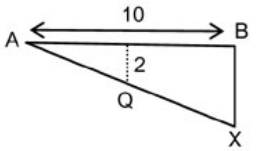
Hence, choice (B). Choice (B)

5. The longest rod that can be placed inside the rectangle can be considered as the dotted lines in the following figures.

Using similar triangles

Case 1: length of PQRS is taken along length of ABCD.



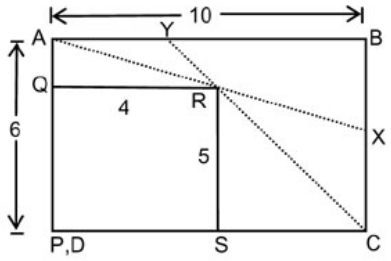


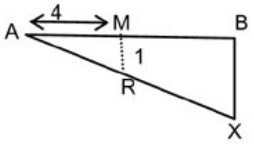
$\frac{5}{2} = \frac{10}{BX} \Rightarrow BX = 4$

$\therefore AX = \sqrt{10^2 + 4^2} = \sqrt{116} = 2\sqrt{29}$

$PB = \sqrt{10^2 + 2^2} = \sqrt{104} = 2\sqrt{26}$

Case 2: The breadth of PQRS is taken along the length of ABCD.





ΔAMR is similar to ΔABX

$\therefore \frac{AM}{AR} = \frac{AB}{BX}$

$\frac{4}{1} = \frac{10}{BX}$

$\Rightarrow BX = 2.5$

$\therefore AX = \sqrt{10^2 + 2.5^2} = \sqrt{106.25}$

Again, ΔCEF, is similar to ΔCBY

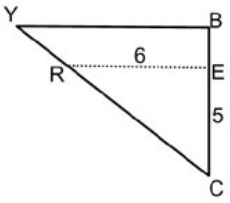
$\frac{CE}{ER} = \frac{CB}{BY}$

$\therefore \frac{5}{6} = \frac{6}{BY}$

$\Rightarrow BY = \frac{36}{5}$

$\therefore CY$

$= \sqrt{6^2 + \left(\frac{36}{5}\right)^2} = \sqrt{87.84}$



Therefore the length of the longest rod is $2\sqrt{29}$ = 10.77 cm

Ans: (10.77)

6. $a = \log_2 222$

$2^7 < 222 < 2^8$

$7 < a < 8$

$b = \log_3 444$

$3^5 < 444 < 3^6$

$5 < b < 6$

$c = \log_2(\log_2 102400)$

$102400 = 2^{10} \times 100$

$2^{16} < \log_2 102400 < 2^{17}$

$\log_2 16 < \log_2(\log_2 102400) < \log_2 17$

$\therefore c < 5$

$d = \log_7 3^{16}$

$\log_7 9^8$

$= \log_7 9 > 1$

$\Rightarrow d > 8$

$\therefore$ Ascending order of numbers = c b a d Choice (C)

7. The total number of ways in which Amar and Prem could have their birthdays = (28) (28) = 784.

The month of February has four Mondays, four Tuesdays, four Wednesdays, four Thursdays, four Fridays, four Saturdays and four Sundays.

The no. of days on which Amar can have his birthday is 28.

The no. of days on which Prem can have his birthdays such that both of them are born on the same day of the week is 4.

$\therefore$ The required probability $\frac{(28)(4)}{(28)(28)} = \frac{1}{7}$

Alternative Solution:

The month of February has each day of the week occurring exactly four times.
Let Amar be born on a certain day of the week (irrespective of the exact day of the month)
i.e., Let Amar be born on, say a Wednesday.
Now, Prem must have been born, on any of the four Wednesday's in that month, out of all the 28 days possible.

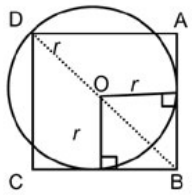
Hence, required probability = $\frac{4}{28}=\frac{1}{7}$. Choice (D)

8. $f(x) = 3x + 5$, $g(x) = 2x + 4$
$f(g(f(g(x)))) = f[g(f(2x + 4))]$
$= f[g(3(2x + 4) + 5))$
$= f(g(6x + 17))$
$= f(2(6x + 17) + 4)$
$= f(12x + 38)$
$= 3(12x + 38) + 5 = 36x+119$
$36x + 119 = 335$
$\Rightarrow 36x = 216 \Rightarrow x = 6$

Alternative Solution:

Given f(g(f(g(x)))) = 335
By observation, we get
g(f(g(x))) = 110 (i.e., (335 – 5)/3)
$\Rightarrow$ f(g(x)) = 53 (i.e., (110 – 4)/2)
$\Rightarrow$ g(x) = 16
$\Rightarrow$ x = 6. Ans: (6)

9. Let O be the centre of the circle and r be the radius of the circle.



Since O is equidistant from AB and BC, O will be on the diagonal BD.

BD = BO + OD = $\sqrt{r^2+r^2}+r=\sqrt{2}r+r$

The area of the square ABCD = $\frac{BD^2}{2}=\frac{\left(\sqrt{2}+1\right)r^2}{2}$

$= \left(\frac{3+2\sqrt{2}}{2}\right)r^2$

$\therefore$ The required ratio = $\left(\frac{3+2\sqrt{2}}{2}\right)r^2 : \pi r^2$

$= 3+2\sqrt{2} : 2\pi$ Choice (C)

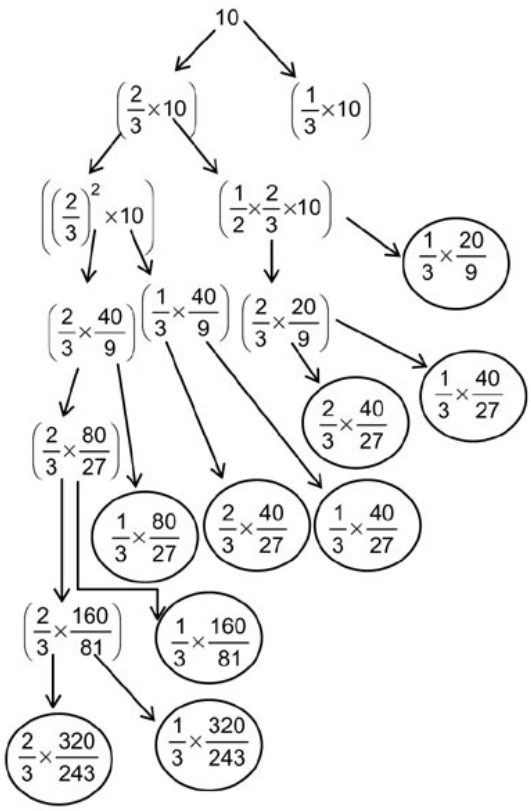
10. Given N = (35)(36) …….(67).

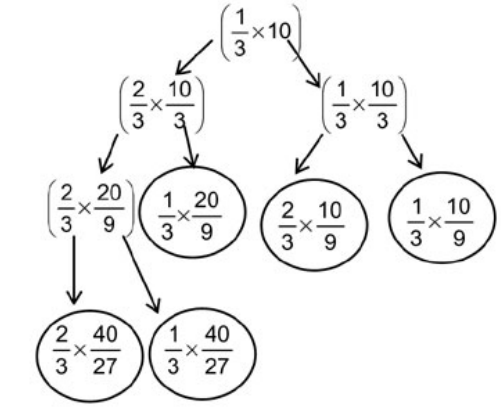
We need the value of $\text{Rem}\left[\frac{N}{289}\right]$

$\therefore \text{Rem}\left[\frac{N}{289}\right] = 17\ \text{Rem}\left[\frac{(1)(2)....(16)(3)(1)(2)....(16)}{17}\right]$

[$\because$ 51= 17(3)]
= 17 (–1) 3(–1) = 51. Choice (C)

11. The pieces are cut successively in the ratio 2 : 1





Here we need not calculate the exact value. Once the ratio of the numerator to the denominator is less than 1, the length of the piece will be less than 1 m.
Total number of pieces (i.e., the circled numbers)
= 9 + 5 = 14 pieces Ans: (14)

12. Since $|x| = x$ for $x \geq 0$
$-x$ for $x < 0$,
to find the region bounded by $|x|+|x+y| = 6$, we need to find the equivalent of $|x|+|x+y| = 6$ in each quadrant.

In quadrant-1: x > 0, y > 0
$|x|+|x+y| = 6$
$\Rightarrow x + x + y = 6$
$\Rightarrow 2x + y = 6$

In quadrant-2: $x < 0$, $y > 0$
Case I: $-x > y$
$\Rightarrow |x|+|x+y| = 6$

$\Rightarrow -x + (x + y) = 6$
$2x + y = -6$
Case I : $x > y$
$\Rightarrow |x| + |x + y| = 6$
$\Rightarrow -x + (x + y) = 6$
$\Rightarrow y = 6$.

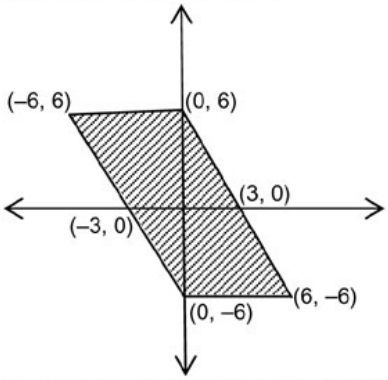
Similarly, in quadrant-3: $x < 0, y < 0$

We get the equivalent of $|x| + |x + y| = 6$ is $2x + y = 6$

In quadrant-4: $x > 0, y > 0$

We get the equivalent of $|x| + |x + y| = 6$ is $y = -6$ for $-y > x$ and $2x + y = 6$ for $x > y$

By plotting these equations in the graph, the region bounded by them will look as follows.

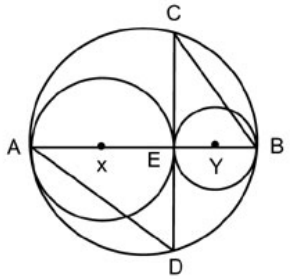


It can be observed the bounded region is in the shape of parallelogram.
$\therefore$ The area of the bounded region = bh
= (6) (6 – (–6))
= 72 sq.units.
Ans: (72)

13. LCM = $1260 = 2^2 \times 3^2 \times 5 \times 7$
For HCF to be a prime number, the ordered pairs should be of the form.
$(2k_1, 2^2k_2)$, $(3k_1, 3^2k_2)$, $(5k_1, 5k_2)$ $(7k_1, 7k_2)$, where k_1& k_2 are coprimes.
The number of ordered pair of the form $(2k_1, 2^2k_2) = 2^3 = 8$ (since 3^2, 5,7 are three terms, which can be the terms of either $k_1$or k_2 but not both).
Similarly, we get 8 cases, 4 cases and 4 cases each with $(3k_1, 3^2k_2)$, $(5k_1, 5k_2)$ and $(7k_1, 7k_2)$ respectively.
Total number of pairs = 8 + 8 + 4 + 4 = 24 pairs.
Ans: (24)

14. Let the three digit number be abc
Given
abc – cba = 594
100a + 10b +c – 100c – 10b – a = 594
99a – 99c =594
a – c = 6
b can take values from 0 to 9
i.e., 10 values
as the difference in absolute values of (a, c) can be (9,3), (8,2), (7,1) (6,0) (3,9), (2,8), (1, 9)
total numbers $7 \times 10 = 70$ numbers Choice (D)

15. In the below figure, let the radii of the circles with centres at X and Y be R and r respectively.



Area of the shaded region
$= \pi(R + r)^2 - \pi R^2 - \pi r^2$
$= 2\pi Rr$
It is given that the shaded area $= 6\pi r^2$
$2\pi Rr = 6\pi r^2$
$\therefore 2R = 6r$
Again ΔCEB is similar to ΔAED
$\angle AED = \angle BEC$ (vertically opposite angles)
$\angle DAE = \angle ECB$ (angles subtended by chord BD)
$\angle ADE = \angle CBE$ (angles subtended by chord AC)
$\therefore \frac{EB}{ED} = \frac{CE}{AE}$
$\Rightarrow$ (EB)(AE) = (CE)(ED)
[Note: the above result, i.e., (EB) (AE) = (CE) (ED) can directly be written down, if one remembers the property pertaining to two intersecting chords (AB and CD in this case) in a circle].
$\Rightarrow (2r)(2R) = (12)(12)$[since E will be the midpoint of CD]
$\Rightarrow (2r)(6r) = (12)(12)$
$\therefore r = 2\sqrt{3}$
Therefore the area of the bigger circle $= \pi(R + r)^2$
$= \pi(3r + r)^2 = 16\pi^2 = 192\pi$ sq.cm.
Choice (C)

16. Let the cost price of each toy be ₹100.
Selling prices will be ₹108, 116, 132, 164, 228 and 356 for six days.
Total cost price = 600
Total selling price = 1104
Percentage by which cost price is less than selling price is
$= \frac{1104 - 600}{1104} = \frac{504}{1104} \approx 45\%$ Choice (A)

17. To find the harmonic mean of a and b we need to find the value of $\frac{1}{a} + \frac{1}{b} = \frac{2}{k}$, say.
Then, k would be the required value.
Given,
$\frac{1}{2a} + \frac{1}{b} = \frac{2}{a}$, i.e., $\left(\frac{1}{a} - \frac{1}{2a}\right) + \frac{1}{b} = \frac{2}{a}$
$\Rightarrow \frac{1}{a} + \frac{1}{b} = \frac{2}{a} + \frac{1}{2a} = \frac{5}{2a}$
Now, if $\frac{5}{2a} = \frac{2}{k}$, then k = $\frac{4a}{5}$ Choice (C)

18. The compensation offered to the two students will be less than the average of the offers which are among the top 25 offers but not among the top 10 offers.
The average of the offers among top 25 offers but not among top 10 offers = $\frac{(25)(17) - (10)(20)}{25 - 10}$
$= \frac{425 - 200}{15} = 15$ lpa
Also, the compensation offered to the two students will be more than the average of the offers which are among top 50 offers but not among the top 40 offers and their value = $\frac{(50)(15) - (40)(16)}{50 - 40}$
$= \frac{750 - 640}{10} = 11$ lpa
$\therefore$ The difference between the maximum possible and minimum possible compensations offered to the two students = 15 – 11 = 4 lpa. Choice (A)

19. Let Arun do x part of work in a day.
Work done by Varun in a day = $3x$ parts
Total work = $(x + 3x) \times 50 = 200x$ parts
Amount of work done by Varun = $3x \times 30 = 90x$
The remaining work is done by Arun,

i.e., $110x$ parts of work.

$\therefore$ Total amount received by Arun $= \frac{110x}{200x} \times 28{,}000$

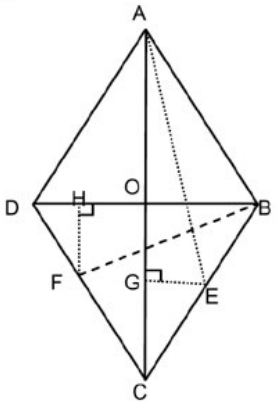
$= \frac{11}{20} \times 28000 = 15{,}400$ Ans: (15400)

20. $f(x + y) + f(x - y) = 2f(x) \cdot f(y)$
When $x = 1$ and $y = 0$,
we get $2f(1) = 2f(1)\, f(0)\, 2f(1)\, [1 - f(0)] = 0$
$f(1) = \frac{5}{4} \therefore f(1) \neq 0$
$\therefore f(0) = 1$
When $x = y = 1$,
we get $f(2) + f(0) = 2f^2(1)$
$\therefore f(2) = 2\left(\frac{5}{4}\right)^2 - 1 = \frac{17}{8}$
When $x = y = 2$,
we get $f(4) + f(0) = 2f^2(2)$
$\therefore f(4) = 2\left(\frac{17}{8}\right)^2 - 1 = \frac{257}{32}$ Choice (B)

21. Let the 8 numbers be a, $a + 1$, $a + 2$ .... $a + 7$.
Let the number which is added thrice is $a + x$
$a + a + 1 + a + 2$ .... $a + 7 + a + x = 1295$
$9a + 28 + x = 1295$
$9a = 1267 - x$
$a = \frac{1260}{9} + \frac{(7 - x)}{9}$
As a and x are integers $x = 7$ and $a = 140$.
The number which is added twice is 147. Ans: (147)

22. $\tan^4\theta + \sec^4\theta - 2\tan^2\theta \sec^2\theta$
$= (\tan^2\theta - \sec^2\theta)^2$
We know that, $\sec^2\theta - \tan^2\theta = 1$
$\Rightarrow (\tan^2\theta - \sec^2\theta)^2 = (1)^2 = 1$ (irrespective of θ)
$\therefore$ The maximum value of $\tan^4\theta + \sec^4\theta - 2\tan^2\theta \sec^2\theta = 1$.
Choice (B)

23. Let the lengths of the diagonals AC and BD be $4a$ and $4b$ respectively.



Let G and H be the foot of the perpendiculars drawn from E to AC and from F to DB respectively.

Since E is the midpoint of BC, $GE = \frac{1}{2}OB$ and $OG = \frac{1}{2}OC$.

$\Rightarrow GE = \frac{1}{2}\left(\frac{1}{2}BD\right)$, $OG = \frac{1}{2}\left(\frac{1}{2}AC\right)$

$\Rightarrow GE = \left(\frac{1}{2}\right)\left(\frac{1}{2}(4b)\right)$, $OG = \left(\frac{1}{2}\right)\left(\frac{1}{2}(4b)\right)$

$\Rightarrow GE = b$, $OG = a$
$AE^2 = AG^2 + GE^2$
$\Rightarrow AE^2 = (AD + OG)^2 + GE^2$
$= (2a + ba)^2 + b^2$
$= 9a^2 + b^2 = \left(\sqrt{83}\right)^2 = 83$ _____ (1)
Similarly, $BF^2 = a^2 + 9b^2$
$= \left(\sqrt{107}\right)^2 = 107$ _____ (2)
Solving, (1) and (2), we get $a = 2\sqrt{2}$ and $b = \sqrt{11}$
$\therefore$ The area of the rhombus $= \frac{1}{2}(4a)(4b)$
$= \frac{1}{2}\left(4\left(2\sqrt{2}\right)\right)\left(4\sqrt{11}\right)$
$= 16\sqrt{22}$ sq units. Choice (D)

24. Let the first term and the common difference of the given arithmetic progression be a and b respectively.
Let the common ratio of the geometric progression be r.
$\Rightarrow a + d = ar$ and $a + (8 - 1)d = ar^3$
$\Rightarrow d = a(r - 1)$ and $a + 7d = ar^3$
Substituting $d = a(r - 1)$ in $a + 7d = ar^3$, we get
$a + 7(a(r - 1) = ar^3$
$\Rightarrow r^3 - 7r + 6 = 0$ and by observation, $(r - 1)$ divides $r^3 - 7r + 6$
i.e., we get $r^3 - 7r + 6 = (r - 1)(r^2 + r - 6)$
$\Rightarrow (r - 1)(r - 2)(r + 3) = 0$
If $r = 1$, $d = a(r - 1) = a(1 - 1) = 0$
$\therefore$ the required ratio $= a + 3d : ar^3$
$= a : a = 1 : 1$
If $r = 2$, $d = a(r - 1) = a(2 - 1) = a$
$\therefore$ The required ratio $= a + 3d : a(2)^3$
$= a + 3(a) : 8a$
$= 1 : 2$
If $r = -3$, $d = a(r - 1) = a(-3 - 1) = -4a$
$\therefore$ The required ratio $= a + 3(-4a) : a(-3)^3$
$= -11a : -27a$
$= 11 : 27$
$\therefore$ Among the given options, only choice (C) is not possible.
Choice (C)

25. In the time Anju takes 72 step, Bobby would take $\frac{72}{K}$ steps so the difference in the distance covered by them at this instant will be $72 - \frac{72}{K}$ steps.
Since speed of Bobby and that of the escalator is same, so half of $\left(72 - \frac{72}{K}\right)$ will be covered by Bobby and the remaining half by the escalator, for Bobby to climb up the escalator.
Total number of steps taken by Bobby
$= \frac{72}{K} + \frac{1}{2}\left(72 - \frac{72}{K}\right)$
$= \frac{36}{K} + 36$
$\therefore$ K must be a factor of 36, except 1, i.e., K can take $(9 - 1) = 8$ values. Choice (B)

26. Let A, M, B be the price of each apple, mango and Banana respectively
Given,
$2A = 3M = 6B$
Let $2A = 3M = 6\ B = 12$
$A = 6$, $M = 4$, $B = 2$
$4A + 5M + 6B = 24+20+12 = 56$
New prices
$A = 6 \times 1.25 = 7.5$
$M = 4 \times 1.4 = 5.6$
$B = 2$
$4\ A + 5M + 6B = 30 + 28 + 12 = 70$

% Increase = $\frac{70-56}{56} \times 100$

= $\frac{14}{56} \times 100 = 25\%$ Choice (A)

27. Let the number of overs bowled by others before Malinga bowled his first over be x_1.
Let the number of overs bowled by others between his first and second over be x_2.
Let the number of overs bowled by others between his second and third over be x_3.
Let the number of overs bowled by others between his third and fourth over be x_4.
$\Rightarrow x_1 + x_2 + x_3 + x_4 = 20 - (4) = 16$
Among x_1, x_2, x_3 and x_4 only x_1 can be zero
$\therefore$ The number of ways in which Malinga could have bowled
$= {}^{16+1-1}C_{4-1} = {}^{16}C_3 = \frac{16\times15\times14}{3\times2\times1} = 560$

Ans: (560)

28. The amount of milk in the solution after n litres of milk was added = $n + \frac{25}{100}(20) = n + 5$ litres
$\Rightarrow$ The fraction of the solution which is water after n litres of milk was added = $\frac{15}{n+20}$

$\Rightarrow \frac{15}{n+20} = \frac{1}{4} \Rightarrow n = 40$

Now, the percentage of milk when n litres of water added
= $\frac{n+5}{2n+20} \times 100$
= $\frac{40+5}{2(40)+20} \times 100 = 45\%$ Choice (B)

29. $S_n = 1 + 2 + 3 \ldots n$
$S_n = \frac{n(n+1)}{2}$
$\frac{n(n+1)}{2} = k^2$ (say, where k is a natural number)
$\Rightarrow n(n+1) = 2k^2$
Here n and n+1 are consecutive integers and hence are co – prime.
For $n(n+1) = 2k^2$, one number should be of form a^2 and other number of form $2b^2$

$a^2 = 1$
(1, 2) ✓

$a^2 = 4$
(3, 4) ×
(4, 5) ×

$a^2 = 9$
(8, 9) ✓
(9, 10) ×

$a^2 = 16$
(15, 16) ×
(16, 17) ×

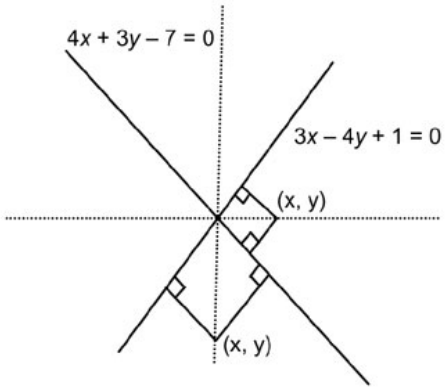
$a^2 = 25$
(24, 25) ×
(25, 26) ×

$a^2 = 36$
(35, 36) ×
(36, 37) ×

$a^2 = 49$
(48, 49) ×
(49, 50) ✓

$\therefore$ There are three values of n (1,8, 49) for which S_n is a perfect square Choice (C)

30. The length of the perpendicular drawn from the centre of the circle to the tangents will equal to that of the radius of the circle.



Let (x, y) be the centre of the circle
$\Rightarrow \frac{|4x+3y-7|}{\sqrt{4^2+3^2}} = \frac{|3x-4y+1|}{\sqrt{3^2+4^2}}$
$\Rightarrow 4x + 3y - 7 = \pm(3x - 4y + 1)$
$\Rightarrow 4x + 3y - 7 - (3x - 4y + 1) = 0$
or
$4x + 3y - 7 + (3x - 4y + 1) = 0$
$\Rightarrow x + 7y - 8 = 0$ or $7x - y - 6 = 0$
i.e., The centre of the circle lies on either $x + 7y - 8 = 0$ or $7x - y - 6 = 0$
$\therefore$ The centre of the circle will definitely satisfy
$(x + 7y - 8)(7x - y - 6) = 0$

Alternative Solution:

The centre of the circle must lie on one of the angle bisectors of the angles formed by the given two lines. The slopes of the given lines are $\frac{-4}{3}$ and $\frac{3}{4}$, i.e., they are perpendicular to each other. Hence one of the angle bisectors will be at an angle (say α) of exactly 45° more than the angle, A, made by the line with slope $\left(\frac{3}{4}\right)$,

i.e., $\tan A = \left(\frac{3}{4}\right)$

$\therefore \tan\alpha = \tan(A + 45°) = \frac{\tan A + 1}{1 - \tan A} = \frac{\frac{3}{4}+1}{1-\frac{3}{4}} = 7$

Hence, slope of the other bisector = $\frac{-1}{7}$

Checking the options (for the slopes of the two lines), only option (B) is possible. Choice (B)

31. Let the distance travelled by the man be d km.
Time taken to travel the distance d at 40 kmph = $d/40$.
Time take to travel the distance d at 50 kmph = $d/50$.
Difference in timings is

$\frac{d}{40} - \frac{d}{50} = \frac{4}{60} + \frac{20}{60}$

$\frac{10d}{2000} = \frac{24}{60}$

$\Rightarrow d = 80$ km.
$\therefore$ Actual time available.

$= \frac{80}{40} - \frac{20}{60}$

= 100 minutes

If the man is travelling at 48 kmph, the time taken to cover 80 km = $\frac{80}{48} \times 60 = 100$ min

∴ He will be on time. Choice (D)

32. Let a be the minimum value of x when $9x + 13y = K$ has five solutions.

Let b be the value of y when $x = a$.

∴ The rest of the solutions will be $(a + 13, b - 9)$, $(a + 26, b - 18)$, $(a + 39, b - 27)$ and $(a + 52, b - 36)$.

Since, x and y have to be positive integers, for K to be minimum we take $a = 1$ and $b - 36 = 1$

$\Rightarrow a = 1$ and $b = 37$

$\Rightarrow$ The value of K = 9(1) + 13(37) = 9 + 481 = 490.

Choice (B)

33. $t_n = n(n + 2) = n^2 + 2n$

$S_n = \sum n^2 + \sum 2n$

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

$S_{15} = \frac{15 \times 16 \times 31}{6} + 15 \times 16$

$= 15 \times 16\left(\frac{37}{6}\right) = 5 \times 8 \times 37 = 1480$ Choice (A)

34. A function $f : A \rightarrow B$ is called onto function if every element of B is an image of at least one element of A.

The no. of elements in A (m) = 5

The no. of elements in B (n) = 4

Then, the no. of onto functions from $A \rightarrow B$ is given by

$n^m - {}^nC_1(n-1)^m + {}^nC_2(n-2)^m + \ldots\ldots\ldots (n \le m)$

∴ The required value = $4^5 - {}^4C_1(4-1)^5 + {}^4C_2(4-2)^5 - {}^4C_3(4-3)^5$

= 1024 – (4(243)) + 6(32) – (4(1))

= 1024 – 972 + 192 – 4

= 240.

Alternative Solution:

For the function to be an onto function, exactly one out of a, b, c, d (in set B) must be mapped to exactly two elements out of the five elements 1, 2, 3, 4, 5 (in set A).

Now, the element mapped to two elements can be selected in 4 ways. Also, the pair of elements in A that are mapped to the same element in B can be chosen in ${}^5C_2 = 10$ ways.

Further the remaining 3 elements in each of A and B can be mapped in 3! ways.

Hence, total number of ways = $4 \times 10 \times 6 = 240$.

Ans: (240)

Difficulty level wise summary - Section I	
Level of Difficulty	Questions
Very Easy	–
Easy	17, 19, 21, 22, 26, 31
Medium	4, 6, 7, 8, 9, 14, 16, 28, 32, 33
Difficult	2, 3, 10, 12, 13, 15, 18, 20, 23, 24, 25, 30, 34
Very Difficult	1, 5, 11, 27, 29

Section – II

Solutions for questions 35 to 38:

35. We can observe that the maximum number of deaths would have occurred either due to Ischemic Heart Disease or Infectious Respiratory Disease.

Number of deaths due to Ischemic Heart Disease

= 27% * 1970 = 531.9

Number of deaths due to Infectious Respiratory Disease

= 29%*1680 = 487.2

Therefore, the second biggest cause of death is Infectious Respiratory Diseases Choice (D)

36. Calculating the deaths for each of the causes given:

(A): Digestive Illness = 8%*1970 = 157.6 mn

(B): Drugs = 12%*980 = 117.6 mn

(C): Tuberculosis = 6%*1680 = 100.8 mn

(D): Stroke = 21%*1970 = 413.7 mn

(E): Ideology = 16%*980 = 156.8 mn

(F): Smallpox = 24%*1680 = 403.2 mn

By observation, we can see that the number of deaths caused is the closest for Digestive Illness and Ideology.

Ans: (AE)

37. The total number of deaths due to War = 12%*980

Number of deaths in World War 2 = 66 mn

Required percentage = $\frac{66}{0.12 \times 980} = 56.12\%$

Choice (C)

38. The total number of deaths due to Murders in 20th century (i.e., 100 years) = 18%*980

Total number of deaths due to Murders per year

= 0.18*980/100 mn

Average annual population = 3 bn = 3000 mn

Number of deaths due to murders per 1000 people (on average) = $\left(0.18 \times \frac{980}{3000 \times 100}\right) \times 1000 = 0.588$

Ans: (0.588)

Solutions for questions 39 to 42:

39. Given that a student can receive an A grade in only one subject. For the student's final grade to be maximum, he/she should have received an A grade in Science, because it has the highest weightage, and should have received B grades in the remaining subjects.

The Final grade of the student in such a case

$\frac{8 \times 3 + 10 \times 4 + 8 \times 2.5 + 8 \times 1.5}{3 + 4 + 2.5 + 1.5} = \frac{96}{11} = 8.727$

Ans: (8.727)

40. The number of students who would have received an F grade in Mathematics, Science, Social and English would be 18, 12, 6, and 30 respectively. Since the total number of F grades received across all the subjects is 66, the theoretical maximum number of students who received 2 F grades will be 33.

The table below shows one of the ways in which the theoretical maximum can be attained.

	Initial Distribution	Iteration 1	Iteration 2	Iteration 3
Mathematics (M)	18	3	3	0
Science (Sc)	12	12	3	0
Social (So)	6	6	6	6
English (E)	30	15	6	6
Condition	15 F's in M and E	9 F's in Sc and E	3 F's in M and Sc	6 F's in So and E

Hence, maximum number of students who would have to attend the Weekend Remedial Session is 33.

Choice (B)

41. The final grade of the student

$= \frac{10 \times 3 + 8 \times 4 + 4 \times 2.5 + 8 \times 1.5}{3 + 4 + 2.5 + 1.5} = \frac{84}{11} = 7.636$

Ans: (7.636)

42. Let the student's Value of grade in Science be a, and the Value of grade in English be b.

$\frac{10 \times 3 + a \times 4 + 6 \times 2.5 + b \times 1.5}{11} = 7.364$

$\Rightarrow 4a + 1.5b = 36$

The values of a and b can only be 6 and 8. Therefore, the student's grade in English must be B corresponding to a value of 8. Choice (B)

Solutions for questions 43 to 46:

Since D's goals against in QF is 5, C must have scored 5 goals in the QF. The cumulative goals scored by C at semi-finals is 6. Hence, C must have scored only one goal in the semis. Since C progressed to the finals, and no match ended in a draw, B must not have scored any goals in the semi-finals.

B has got 3 goals against it at semi-finals. 1 goal out of this 3 was scored by C. Hence, the other 2 goals must have been scored by A in the quarter-finals.

In QF-3, E must have scored no goals, since F scored only one goal and progressed to the semi-finals. In the semi-finals, F has 4 goals against it. Since no goals were scored against F in the quarter-finals, the 4 goals must have been scored by H in the semi-finals. The total number of goals that H scored until semi-finals must be 6 (2 in the quarter-finals and 4 in the semi-finals). Since H scored 7 goals at the end of the finals, it must have scored only one goal in the finals.

C has got 5 goals against it at the end of the finals. 1 goal out of this 5 is by H. The remaining must be in semi-finals and quarter-finals. But B did not score any goals in the semi-finals. Hence, D must have scored these 4 goals in the quarter-finals.

Further, H has got 7 goals against it at the end of the finals. H could have had a maximum of 1 goal against it in the quarter-finals (since H scored 2 goals) and a maximum of 3 goals against it in the semi-finals (since H scored 4 goals). Hence, in the finals, C must have scored at least 2 goals and at most 7 goals against H. The following table gives the goals scored by the teams.

Quarter-finals				Semi-finals				Finals		
Match	Teams	Goals For	Goals Against	Match	Teams	Goals For	Goals Against	Teams	Goals For	Goals Against
QF-1	A	2	4	SF-1	B	4	3	C		5
	B	4	2		C	6	4			
QF-2	C	5	4							
	D	4	5							
QF-3	E	0	1	SF-2	F		4	H	7	6
	F	1	0		H	6				
QF-4	G		2							
	H	2								

43. H scored 4 goals in the semi-finals against F.
Choice (B)

44. The minimum number of goals that could have been scored by the winner of the tournament (C) in the finals is 2.
Ans: (2)

45. D scored 4 goals against C in the quarter-finals.
Choice (C)

46. In QF-2 the maximum number of goals were scored by both the teams together (5 + 4 = 9 goals). Choice (D)

Solutions for questions 47 to 50:

Given the ratings of the restaurant, we can determine the range in which the values of the blank cells should fall in.
For Restaurant 1, the total of the Courses other than 1 and 6 is 159. This must be at least 175 for this restaurant to receive a rating of 5. Hence, the sum of the time taken for the two Courses must be at least 16.
For Restaurant 2, the total time (except Course 5) is 129 minutes. This must be between 140 to 174. Hence, the time taken for serving Course 5 must be at least 11 minutes and at most 45 minutes.
For Restaurant 3, the total time (except Course 7) is 94 minutes. Course 7 time must be at most 10 minutes.
Similarly, time taken for Course 3 at Restaurant 4 must be at most 15 minutes.
Time taken for Course 4 at Restaurant 5 must be at most 14 minutes.
Time taken for Course 3 at Restaurant 6 must be at least 7 minutes and at most 41 minutes.

47. Course 3 at Restaurant 6 must have been served in at least 7 minutes and at most 41 minutes. Ans: (BCDEF)

48. Across all the restaurants,
the minimum possible serving time for Course 3
= 34 + 15 + 6 + 0 + 14 + 7 = 76 minutes
the maximum possible serving time for Course 3
= 34 + 15 + 6 + 15 + 14 + 42 = 126 minutes
the minimum possible serving time for Course 4
= 42 + 36 + 21 + 7 + 0 + 27 = 133 minutes
the maximum possible serving time for Course 4
= 42 + 36 + 21 + 7 + 14 + 27 = 147 minutes
the minimum possible serving time for Course 5
= 28 + 11 + 20 + 5 + 17 + 11 = 92 minutes
the maximum possible serving time for Course 5
= 28 + 46 + 20 + 5 + 17 + 11 = 127 minutes
the minimum possible serving time for Course 7
= 113 minutes
the maximum possible serving time for Course 7
= 123 minutes
By observing these values, we can say that the maximum average serving time will be for Course 4.
Choice (B)

49. Time taken to serve Course 3 in Restaurant 4
$= 9.28 \times 7 - (8 + 9 + 7 + 5 + 10 + 15) = 11$ minutes
Ans: (11)

50. Among the given statements, the statement given in option D is definitely false. Choice (D)

Solutions for questions 51 to 54:

From (iii), Dadu must have received at least third rank in Architecture. From (i), we can say that Dadu could have received only third rank because if Dadu received second rank and he was the last, then three students must have received the second rank which is not possible. Hence, Dadu received third rank in Architecture and Amit must have received fourth rank in Mathematics.

From (v), Amit received a worse rank in Physics than only Dadu. This is possible only if Dadu received first rank in Physics and Amit received second rank. Since Amit received all the four ranks and he got a different rank than everyone else in Architecture, he must have received first rank in Architecture (since he already has 2nd and 4th ranks). Therefore, he must have received third rank in Chemistry.

Dadu could not have received the fourth rank in Mathematics (since Amit already has the fourth rank in Mathematics). He could not have received the 3rd rank in Mathematics (since he already has a 3rd rank in Architecture from (i)). Hence, he must have received second rank in Mathematics (from (v)). Bobby must have received the first rank in Mathematics. From (iii), Chetan must have received the third rank in Mathematics.

In Architecture, Dadu has received the last rank i.e. three. This implies that the other three students must have received 1, 2, 3 ranks. Since Amit has first rank in Architecture and Chetan has third rank in Mathematics, Bobby must have received third rank in Architecture and Chetan second rank.

In Physics, Bobby and Chetan could have received 2nd rank or 4th rank. From (iii), Chetan could not have received fourth rank in Physics. Hence, Chetan received 2nd rank in Physics and Bobby 4th rank. Also, from (iii), Bobby must have received fourth rank in Chemistry (since he could not have received third rank).

The following table gives the ranks of the students:

	Architecture	Mathematics	Physics	Chemistry
Amit	1	4	2	3
Bobby	3	1	4	4
Chetan	2	3	2	1/2
Dadu	3	2	1	1/2

51. Bobby received the first rank in Mathematics. Choice (B)

52. Amit received a better rank than Bobby in all subjects, except in Mathematics. Ans: (ABD)

53. Either Chetan or Dadu or both could have received the first rank in Chemistry. Choice (D)

54. In Architecture and Physics, two students definitely received the same rank, i.e., in at least two subjects. Choice (C)

Solutions for questions 55 to 58:

Given that 5 tons was loaded on to the truck at depot C. This is only possible if two cartons of weights 2 tons and 3 tons were loaded on to the truck. From (v), the 3 ton carton must have been unloaded at depot D.
Since the 4 ton carton was in the truck for three depots, it could have been loaded on to the truck at A or B or C. Loading 4 tons at C is not possible. Unloading 4 tons carton at D is not possible because 3 ton carton is being unloaded at depot D. Hence, the 4 ton carton would have been loaded on to the truck at depot B and unloaded from the truck at depot E.

From (iii), one carton was unloaded at depot B. This carton must have been loaded on to the truck at depot A. Since 4 tons, 3 tons and 2 tons are loaded on to the truck at depots B and C, the carton that must have been unloaded at depot B must be the 7 ton or 2 ton carton. From (v), it can't be the 2 ton carton. Therefore, 7 ton carton must have been loaded at depot A and unloaded at depot B.

Similarly one carton must have been unloaded at depot C as well. The remaining cartons are 7 ton carton and 2 ton carton. If 7 ton carton was loaded on to the truck at A or B, it would result in more than 9 tons being present on the truck. Hence, 2 ton carton must have been loaded on to the truck at A or B. From (v), the 2 ton carton must have been loaded on to the truck at depot A. The remaining 7 ton carton must have been loaded on to the truck at depot E and unloaded from the truck at depot F. Also, the 2 ton carton loaded on to the truck at depot C must have been unloaded at depot F.

The following table gives the cartons loaded and unloaded from the truck at various depots.

	A	B	C	D	E	F
Loaded	2,7	4	3,2	X	7	X
Unloaded	X	7	2	3	4	2,7
In the truck	2,7	2,4	2,3,4	2,4	2,7	X

55. The 7 ton carton was unloaded at depot B. Choice (A)

56. The truck had three cartons in it only when leaving depot C. Choice (B)

57. The 4 ton carton was loaded onto the truck at depot B. Choice (D)

58. The minimum total weight of all the cartons loaded at a single depot is 4 tons. Ans: (4)

Solutions for questions 59 to 62:

Given that every person spoke exactly one true statement.
Let the first statement of Hitesh be true. Hence, the other two must be false.
Therefore, Hitesh is not from India. Naren is not a Lawyer and Pavan is not from the USA.

Naren second statement is, therefore, true. Hence, his first and third statements must be false. Hence, Naren is not a Doctor and Hitesh is not a Lawyer. Naren has to be an Accountant. Hitesh should be a Doctor. Pavan must be a lawyer.

Hence, Pavan's last statement is true. But Pavan's first statement is also true. Since this is not possible, Hitesh' first statement cannot be true.

Let the second statement of Hitesh be true. Therefore, Naren is a lawyer. From his other two statements, we can say that Hitesh is from India and Pavan is from the UK. Hence, Naren is from the USA. Naren's second statement is true. His first and third statements are false.

Pavan's second statement is true. His first and third statements must be false. Therefore, Hitesh must be an accountant and Pavan must be a doctor. This is one possible case.
Let Hitesh's third statement be true. Pavan must be from the USA. From his first statement, we get Hitesh must be from India. Therefore, Naren must be from the UK. Naren is not a lawyer.

Naren's second statement and Pavan's second statement are false. The only case possible in which both Naren and Pavan tell one true statement each is when Naren's first statement and Pavan's third statement are true. Hence, Naren is a Doctor, Pavan is a Lawyer and Hitesh is an Accountant. This is another possible case.

The possible cases are presented in the following table.

Person	Country	Profession
Hitesh	India	Accountant
Naren/Pavan	USA	Lawyer
Pavan/Naren	UK	Doctor

59. The Doctor is from UK. Choice (A)

60. The person from USA is a Lawyer. Choice (B)

61. Naren can be from USA or UK. Choice (D)

62. Only statements (A) and (C) are definitely true. Ans: (AC)

Solutions for questions 63 to 66:

Given that Radcliffe visited South America and Malinowski studies Azande.
Combining i, ii and iii, Radcliffe could not have studied Nuer or Kipsigas or Azande or Trobrianders. Therefore, Radcliffe could only have studied the Winnebago.
From ii and iii, the Trobrianders could have been studied either by Vidyarthi or Srinivas but from iv, only Srinivas could have studied Trobrianders.
Of the remaining tribes, Kipsigas could have been studied only by Mead and therefore, Nuer by Vidyarthi.

The following table gives the information about the tribes and their locations.

Anthropologist	Radcliffe	Malinowski	Srinivas	Vidyarthi	Mead
Tribe	Winnebago	Australia / Asia	Trobrianders	Nuer	Kipsigas
Location	South America	Azande	North America	Australia / Asia / Africa	Australia / Africa / Asia

63. Mead studied the Kipsigas. Choice (A)

64. If Vidyarthi studied the tribe from Australia, Malinowski would have studied the Azande from Asia and therefore, Mead would have studied Kipsigas from Africa. Choice (D)

65. Srinivas studied the tribe from North America. Choice (B)

66. If Azande are from Australia, Nuer can be from either Africa or Asia. Hence, the answer cannot be determined. Choice (D)

Difficulty level wise summary - Section II	
Level of Difficulty	Questions
Very Easy	–
Easy	35, 36, 37, 41, 47, 48, 49, 50, 63, 64, 65, 66
Medium	38, 39, 42, 43, 44, 45, 46, 55, 56, 57, 58, 59, 60, 61, 62
Difficult	40, 51, 52, 53, 54
Very Difficult	

Section – III

Solutions for questions 67 to 69:

67. In choice A, the idiom 'makes no bones' means "to be forthright and candid about; acknowledge freely". In choice B, the idiom "made light of" means "to make compensation for; make up for." In choice C, the correct idiom is "made good the loss". This means to make compensation for; to make up for. In choice D, the idiom "make bold' means to venture. Ans: (C)

68. Choice A should read as 'tried my every muscle' (means 'to subject to great strain or hardship) instead of 'tried out'. In choice B, 'tried' refers to 'to conduct the trial of (a legal claim).' In choice C, 'tried' indicates 'tried to open'. Choice D is incorrect. The correct sentence is "I need to try my hand at surfing." This means 'To attempt to do something for the first time.' Ans: (AD)

69. The usage of the word 'light' is incorrect in choice B. The correct idiom is 'brought to light' which means to reveal or cause to be noticed. In choice A, the idiom 'light at the end of the tunnel' means 'the prospect of success, relief, or escape after strenuous effort.' In choice C, the idiom 'shed light' means 'To provide information about or clarify (something).' In choice D, 'acted according to their own lights' means 'one's own individual choices, standards or opinions'. Ans: (B)

Solutions for questions 70 and 71:

70. Statement B is a general sentence that begins the paragraph. It sets the background of the discussion. (The most important quality of leadership is the "reality principle"). Statement A follows as it defines this reality principle. "What's the reality?" echoes the same point. Statement D continues as 'this quality' refers to the reality principle. So, BAD. Sentence C is the odd man out as it runs tangent to the remaining three sentences. The other sentences talk about reality whereas sentence C speaks about happiness. Choice (C)

71. Statement C is a general sentence that begins the paragraph. It explains the features of the act of writing (down a goal). Statement B then continues by saying what writing a **goal** does to one's senses. Statement D closes the paragraph (Writing **the goal** ..... subconscious mind). So, CBD. Statement A is the odd man out as it talks about 'goals' in general and not about 'writing down your goals.' Choice (A)

Solutions for questions 72 and 73:

72. "Choice A is not mentioned. The passage uses the example of literature etc to draw a parallel with the sciences. Choice B is an exaggeration and the passage does not state anything like this. Choice C seems closest to the essence of the paragraph as it talks about why 20th century tenets are important to us. Choice D is nowhere stated. Choice (C)

73. This extract is from Peter Drucker's book "Management". The first part of Choice A is incorrect. The paragraph does not explicitly cite "motivation" and "training" as methods to enhance the performance of an average employee. So choice B is incorrect as a summary. Choice C is limited to the first sentence of the paragraph and is incomplete as a summary. Choice D is an apt summary of the given paragraph. It has been mentioned repeatedly in the paragraph that the purpose of the organization is to enable a common (ordinary) man to do uncommon (extraordinary) things. Choice (D)

Solutions for questions 74 to 76:

74. On a careful reading of the sentences, it can be observed that sentence (f) is a general sentence that begins the paragraph. Your beliefs are **always** ..... Sentence (d) continues as "your beliefs are always manifested" in sentence (f) links with "consistent with the beliefs" in sentence (d) and "words and actions" in sentence (f) links with "everything you say and do" in sentence (d). Sentence

(a) (In time, you will) follows as a consequence after the step undertaken in sentence (d). Sentence (c) is a long term effect (Over time, you will completely.....). Sentence (e) sums up the changes in your life. Sentence (b) is the odd sentence out as it runs tangent to the remaining sentences. The comment in sentence (b) does not fit with beliefs, successful life etc that the other sentences expand on. So, fdace. The other choices disrupt the thoughtflow.
Choice (D)

75. On a careful reading of the sentences in the paragraph, it can be inferred that all sentences except for sentence (a) talk about people (successful people/ solution oriented people/ problem-oriented people). Sentence (a) limits the discussion to management consulting practices and solutions and problems in the workplace. It does not necessarily apply to people in general. Sentence (b) is a general sentence that begins the paragraph. Successful people have a particular way of thinking ..... Sentence (d) follows. "successful people have a particular way of thinking or solution-orientation" in sentence (b) links with "successful people think about solutions...." in sentence (d). After the introduction of the term 'solution' in sentences (b) and (d), sentence (f) with the term 'solution-oriented people' can continue the discussion. Sentence (e) provides the relevant contrast with "on the other hand". Sentence (c) concludes the paragraph. So, bdfec. Statement (a) is the odd sentence out. It can be a part of a paragraph earlier in the text. It is a misdirection statement with the words 'problem' and 'solution' in it. Choice (C)

76. On a careful reading of the sentences, it can be inferred that either sentence (a) or sentence (c) can start the paragraph. Sentences (a) and (c) form a mandatory pair . This pair of sentences is followed by sentence (f). Actually, 'acf' is a better sequence than 'caf'. However since the 'but' in sentence (d) means it must follow (f) and not (e), choice B is the right choice. Sentence (c) is a general sentence that can begin the paragraph with the premise: Effective decision makers resist pressures to make lightning quick choices. Sentences (c) and (a) form a mandatory pair. "lightning quick choices" in sentence (c) links with "Habitually shooting from the hip" in sentence (a). Sentence (f) follows with the conjunctive adverb 'however'. After discussing 'lightning quick choices' in sentences (c) and (a), sentence (f) goes on to discuss that it is not possible to slow down the decisin making process. Delay is wrongly taken to imply 'indecisiveness'. Sentence (d) continues the discussion with the contrast conjunction 'but'. Concentration results in sharp thinking. Sentence (b) and (e) form a mandatory pair and conclude the paragraph. "he deliberated" in sentence (e) links with "sustained deliberation" given earlier in sentence (d). Also "the instant he saw an apple drop ....." in sentence (b) resonates with "faster, lightning quick" mentioned earlier in sentence (c). So, cafdbe. Sentence (g) is the odd sentence out as it runs tangent to the remaining sentences. Choice (B)

Solutions for questions 77 to 80:

77. The passage explores the possibility of English becoming the only language in the world. However, it states that such fears are "premature".
Option A: Having access to a language does not guarantee that it will become the primary language for a person. The passage says that few would "welcome (the) loss of this variety". Therefore, we cannot conclude that having access to the English language will result in other languages becoming extinct.
Option B: The passage does not mention the complexity of the English language as a reason for speakers of other language not speaking English. Since this cannot be inferred from the passage, it cannot be the right answer.
Option C: The passage says that there will continue to be "a multiplicity of nations and cultures on our planet and, along with them, various languages besides English." From this we can say that as long as various nations are present, various languages will also be present. If language forms one of the primary basis for the identity of a nation, the language will also exist along with the nation.
Hence, this statement best supports the claim.
Option D: The passage does not mention that expressing in a language other than English is more delightful than expressing in English. It only says that being able to expressing in several languages is "a delight in countless ways". Hence, this cannot be the answer.
Therefore, option C is the right answer. Choice (C)

78. The passage says that even though the population of Illinois has reduced in the past year, this does not necessarily imply that there is a crisis in the state. The reduction in the population can be due to more number of people leaving the state or less number of people moving into the state assuming birth and death rates do not change drastically.
Option A: This statement gives a possible explanation for the loss in population of the state. If a large number of people shifted temporarily to Illinois, then the loss in population because of these people leaving the state will be a one-off incident and will not result in any crisis. Therefore, this statement supports the author's claim.
Option B: If recession has affected the country, then the migration must be affected equally across all the states in the country. This cannot explain the loss in population of Illinois last year. Therefore, this statement neither supports nor weakens the claim that the numbers do not mean a crisis.
Option C: If high taxes were a reason for people not moving into Illinois, the trend will most likely continue in the future. Therefore, there is a possibility that this will become a crisis. Hence, this cannot be the correct answer.
Option D: Even if Gov. Bruce Rauner is in the habit of publicizing obscure facts, it does not invalidate the implications of this fact. Therefore, this statement also, plays no part in supporting or weakening the claim. Hence, the answer is option A. Choice (A)

79. According to the passage, every city aimed to attract and retain college graduates but not all were successful.
Option A: Educational institutions can guarantee that more number of students graduate every year, but does not guarantee that they will stay in the city. The passage does not give any indication that the lack of educational institutions has been the reason why cities are not able to retain graduates. Hence, this cannot be an effective strategy.
Option B: According to the passage, college graduates were attracted to "fast-growing industries". While these industries might provide fast growing jobs, it cannot be said that the fast growing jobs primarily attract college graduates. Hence, this too cannot be an effective strategy.
Option C: Dr. Betz states that college graduates were following "fast-growing industries". Therefore, investing in high growth industries will attract college graduates. Therefore, this can be an effective strategy.
Option D: Dr. Betz says that "It seemed like a case of the rich getting richer," referring to college graduates. But he later explains that this is not the case as they were attracted to fast growing industries. Therefore, according to the passage, we can say that college graduates will not attract more college graduates. Hence, this cannot be an effective strategy.
Therefore, the answer is option C. Choice (C)

80. The passage says that swift advances in electronic technology favours "large "closed" businesses" over small businesses. These small businesses benefit the most by using open source systems.
Option A: The rapid evolution of electronic technology does not inherently favour closed systems over open systems. It favours large businesses over small businesses. However, since small businesses benefit the most by using open source systems, open source movement is held back. Hence, the technological advancements does not directly favour closed systems over open systems and hence, this option cannot be a possible reason.

Option B: Large businesses are benefitted from swift advances in electronic technology. One possible reason for this might be because they usually have deep pockets and can withstand the losses incurred due to obsolescence of technology which small businesses cannot. Therefore, this statement could be a possible reason how technological advance impacts open source movement.
Option C: The passage says that "What's held back the open-source hardware movement is not a lack of business acumen". Business acumen can be said to include market intelligence. Therefore, the lack of market intelligence cannot be a reason.
Option D: This option if true can be a reason why closed systems are favoured over open systems. But it does not support why large businesses are favoured over small businesses. Hence, this statement cannot be a possible reason. Therefore, the answer is option B. Choice (B)

Solutions for questions 81 to 96:

Number of words and Explanatory notes for RC:

Number of words : Passage – I: 571
Passage – II: 530
Passage – III: 702
Passage – IV: 586

81. The "aerial spraying of coca crops" was banned by the Colombian government "defying the United States". From the passage we can see that the emphasis of US in fighting against drug trade was on "prohibition and punishment". Therefore, the aerial spraying of coca crops supported by US must in some way destroy the crop and deter drug trade.
Option A: The withering and reduction in export of the crop could be one of the primary objectives of US in fighting drug trade given the approach that they follow. Hence, this could be the correct answer.
Option B: Accelerating the growth of coca crops will not deter drug trade nor its production. Hence, this cannot be the right answer.
Option C: Improving the marketability of the product also cannot be an objective of the US government. Hence, this option is also incorrect.
Option D: An increase in the quantity available for export from Colombia will imply more drugs flowing into US which cannot be its objective. Hence, this option is also incorrect.
Among the given options, option A is the most suitable.
Choice (A)

82. The change in the role of Washington mentioned in the passage refers to Washington "doing more listening than lecturing".
Option A: The strained relationship is one of the reasons Washington has to emphasize "tools and expertise" rather than punishment. But this does not refer to how the role of Washington has already changed from that of a lecturer to a listener.
Option B: This realization has resulted in the need to develop fresh approaches to the problem. But the passage does not mention this as a reason for the change in the role of Washington.
Option C: The "domestic debate about the legalization of marijuana and sentencing reform for drug crimes" is one of the primary reasons for the change in the role of United States according to the passage. Hence, this is the correct option.
Option D: The decline in the authority of US in Latin America is not a reason for the change of role.
Hence, the correct answer is option C. Choice (C)

83. The "largely failed traditional approach" is an approach which emphasized "prohibition and punishment".
Option A: Uruguay has legalized recreational use of marijuana which cannot be an aspect of the traditional approach mentioned in the passage. Hence, this cannot be the right answer.
Option B: Bolivia allows "farmers to grow modest crops of coca" which also cannot be an aspect of the traditional approach.
Option C: Colombian justice minister outlined plans which included "decriminalizing consumption" and "finding alternatives to incarceration for minor drug offenses" which cannot be considered as traditional approach.
Option D: Peru continues to fight drug trade with "strict and punitive policies". This is similar to emphasizing "prohibition and punishment". Hence, Peru is the only country that is fighting the drug trade with traditional approach.
Ans: (D)

84. The passage states that "a broadly accepted regional approach (to tackle the scourge of cocaine) remains a distant goal in a politically diverse hemisphere with many strained relationships". One way of strengthening regional cooperation is also mentioned in the passage which is if Washington "places greater emphasis on the tools and expertise it has to offer" and convinces the Latin American countries that it is to their own benefit if they allow the United States to work along with them in the fight against drug trade..
Option A: According to the passage the United States could possibly improve the manner in which it deals with some of the Latin American countries. However, the passage does not mention about the United States helping the politically divergent Latin American countries to work towards improving their relations among themselves. Hence, this is not the right answer.
Option B: While this can be a viable choice for the Latin American governments to formulate a regional approach, the passage does not provide any indication towards this solution. Hence, this option is also incorrect.
Option C: The passage states that "Washington may be able to strengthen regional cooperation if it places greater emphasis on the tools and expertise it has to offer, rather than punishing those that are deemed to be taking insufficient steps to curb the drug trade". The statement given in the option also states the same. Hence, this is the correct answer.
Option D: The passage does not indicate this suggestion for a regional approach in Latin America.
Therefore, option C is the right answer. Choice (C)

85. The concept of "Racial degeneration" is the hypothesis that under "the artificial conditions of the urbanized society", the "poorest traits" are passed on over generations.
Option A: This statement is not an assumption in the hypothesis. This statement only mentions one of the possible reasons for racial degeneration.
Option B: The concept of racial degeneration was proposed to explain the ill health and increase in crime among the lower classes. If ill health and criminal tendencies are considered hereditary and if these traits are common among lower classes, this will explain the rise in ill health and crimes among lower classes. Hence, this statement is an inherent assumption of racial degeneration concept.
Option C: This statement presents a generalization of the concept of racial degeneration which concerns itself only with urbanized societies. Hence, this cannot be an assumption in the concept.
Option D: While certain section of the people "blamed the government policies" for increase in crime and ill health, another section of people explained this in terms of "racial degeneration". This concept of racial degeneration did not emerge from the belief that government cannot be blamed for this situation but it emerged from Darwin's natural selection and Spencer's "survival of the fittest". Hence, this statement cannot be an assumption of this concept.
Hence, option B is the right answer. Choice (B)

86. The concept of "racial degeneration" gained popularity because of various factors mentioned in the first and third paragraph.
Option A: The "failure of successive liberal governments" added fuel to this idea (of racial degeneration) according to

the passage. Hence, this contributed to its increase in popularity.
Option B: The rapid increase in the urban population was the main reason which led to problems of "overcrowding, poverty, crime and ill health, particularly among the lower classes." Racial degeneration was proposed to explain this concept. Hence, this also contributed to the increase in its popularity.
Option C: The migration of workers leading to "racial contamination" was also considered as a reason for the problems of ill health and crime among lower classes. Hence, this factor also contributed to the growth in its popularity.
Option D: The unprecedented economic growth in Britain resulted in material well-being. While this increased the population, it did not directly contribute to the growth in popularity of racial degeneration. This economic growth is very remotely related to the growth in the popularity of racial degeneration. Therefore, this factor contributed the least to the growth in popularity of racial degeneration.
Choice (D)

87. Francis Galton's intention in studying eugenics (mentioned in the very beginning of the passage) was to 'to improve the racial pedigree of the British and reverse the effects of degeneration". Degeneration, in turn, was considered to be a result of the rise of crime and ill health, traits that were considered to be hereditary, among the lower classes, given the prevalent conditions in the society.
Option A: The waves of immigrants was stated as a reason in the passage for the increase in crime and ill health. Further, the theory "was reinforced by mounting anxiety about the effects of race mixing on the genetic vitality of the nation". Hence, this statement, if true, will support the study of eugenics to understand how mixing with immigrants results in increase in ill health and crime.
Option B: Inconclusive studies need not weaken the argument the study for eugenics nor will they inhibit anyone else from studying the correlation between the two. Therefore, this statement will not necessarily weaken the argument.
Option C: This statement, if true, will imply that most of the diseases are not hereditary. Criminal tendencies also were not hereditary because they spread due to socio-economic environment. Therefore, the study of eugenics will only impact a small number of diseases which might be hereditary. This will reduce the impact this study will have in improving racial pedigree. Therefore, this statement will weaken the argument for the study of eugenics.
Option D: If the incidence of these traits are different for different races, it makes even more sense to study eugenics to understand which races reduce the "quality of the nation's bloodstocks."
Hence, option C is the right answer. Choice (C)

88. Galton primarily used "facial photography" for scientific research to know more about heredity and degeneration.
Option A: The people who are more prone to ill health and crime contribute to racial contamination. If these people can be identified by their facial features, then photographs of their faces can be used to determine the types of people responsible for contamination. Hence, this statement will support Galton' use of photography to study eugenics.
Option B: Even though the race of an individual can be identified by his/her facial features, it does not necessarily mean that the correlation between racial contamination and facial features can be determined using photography. Hence, this statement does not support Galton's use of photography.
Option C: The distinctiveness of the facial features of immigrants and native Brits does not indicate the racial contamination. This is because even among native Brits, the lower classes were thought to have traits related to ill health and crime. Hence, this statement also does not support the use of photography.
Option D: If traits related to ill health or criminal tendencies has little correlation to his/her facial features, then the use of photography, which was mainly facial photography, will not be useful in studying the link between heredity and ill health or criminal tendencies.
Therefore, option A is the correct answer. Choice (A)

89. Neoclassical theory states that "under certain assumptions, markets provide an efficient allocation of scarce resources in response to the demands of insatiable consumers." One of these assumptions is mentioned in the subsequent paragraph, which states that households and firms "independently make rational decisions." The violation of these assumptions will reduce the efficiency of the markets.
Option A: The passage later mentions how individuals are influenced by other factors. One of these influences is the "behavior of other consumers". This influence is one of the factors which results in the violation of the assumption mentioned earlier. Hence, this might reduce the efficiency of the market.
Option B: "Rational" is defined in the passage as "choosing the best means to pursue a goal". Purchasing a product that best suits one's needs can be classified as a rational decision by this definition. Hence, this will definitely not violate the assumption and hence, will not reduce the efficiency of the markets.
Option C: "The marketing strategies of firms" is one of the influences which might result in customers not taking "rational" decisions. Hence, this will also violate the assumption.
Option D: "Traditions and habits" is another influence mentioned in the passage which might not result in rational decisions. Hence, this option is also incorrect.
Therefore, option B is the right answer. Choice (B)

90. The markets according to neoclassical theory "allocates scarce resources" under certain assumptions.
Option A: The markets do not act as an aggregator of influences. The passage mentions that neoclassical economics "models only one sort of influence". Hence, this option is incorrect.
Option B: The market does not consider the network of relations between individuals and firms. They "independently make rational decisions" Hence, this option is incorrect.
Option C: The markets aggregate the "choices independently made by the individual units". This aggregation by the market can be used "to determine what happens in the economy as a whole". Hence, this option is correct.
Option D: The market does allocate scarce resources depending on the consumer demand. But the market does so when certain conditions are satisfied, i.e. individuals and firms take rational decisions. Hence, markets do not "unconditionally" allocate scarce resources.
Hence, option C is the correct choice. Ans: (C)

91. According to the passage, in the Western economies, "market forces have been encouraged to develop in areas where they were previously given less scope". But since the 1990s, "the inequalities and the inefficiencies of market-based capitalism" came to light in these Western economies.
Option A: This option best describes the situation in the Western economies in the 1980s and the 1990s. The role of markets was expanded in 1980s to include labour markets and government services. But by 1990s, the inefficiencies of this market based capitalism resulted in a deep unease. Hence, this is the correct option.
Option B: The scope of market based economies was expanded in 1980s. There is no indication in the passage to say that the scope increased further in 1990s. Hence, this option is incorrect.
Option C: The passage states that market-based economy generates material well-being "much more reliably than any other alternative economic system". But the passage does not make a comparison between the economic systems present in the 1980s or between those present in the 1990s. It only mentions the shortcomings of this market-

based economy realised in the 1990s, and we cannot comment on whether or not this system was the most reliable. Hence, this option is incorrect.
Option D: Government intervention was introduced in Japan and Germany in 1990s which was examined by Eastern European countries. But the passage does not talk about Western economies mulling about government intervention. Hence, this option is incorrect.
Therefore, option A is the right answer. Choice (A)

92. The passage states that neoclassical economics "models only one sort of influence that goes through the market by demand and supply affecting the prices at which individuals can trade". According to the assumptions of neoclassical theory, firms pursue profit maximization and household pursue utility maximization.
Option A: The pursuit of profit maximization by firms will not be overlooked by neoclassical economist because it impacts on the decisions made with respect to supply of goods and services, 'supply' being an inherent assumption in the neoclassical theory.
Option B: The price at which individuals buy a product is also not overlooked by a neoclassical economist because he models the influence of demand and supply on the price.
Option C: The influence of institutional structures on the market is an influence outside the scope of neoclassical economics. A neoclassical economist does not "necessarily deny" that this influence exists, but since it is not central to neoclassical economics, he is most likely to overlook this influence.
Option D: The influence of demand on price of a product is an influence that will always be recognised by a neoclassical economist.
Therefore, the correct answer is option C. Choice (C)

93. According to the passage, physics "cannot predict much of what we see in the real world" because "causes at those higher levels in the hierarchy of complexity have real effects at lower levels". Physics also cannot determine the "laws of behaviour in complex systems". "If physics is able to predict all", i.e., higher level effects, like behaviour, from lower level causes, then "free will would be illusory".
Option A: According to the passage, physics is already able to explain laws governing behaviour at lower levels of complexity but it is the higher levels where physics is not able to explain. Hence, this is not the correct option.
Option B: "If physics is able to predict all", i.e., higher level effects, like behaviour, from lower level causes, then "free will would be illusory". However, the statement given puts the argument the other way around. Hence, this is not the correct answer choice.
Option C: As explained above, if physics can explain the effects at higher levels (i.e., predict behaviour) from lower level causes, then physics will be able to explain free will, and "free will" will then become an illusion. Hence, option C is the correct answer. Choice (C)

94. The author says that "different descriptive language applies at each level" when talking about the lower and higher levels of a hierarchical system.
Option A: A complex system is "hierarchical in that layers of order and complexity build upon each other". In such a system, different subjects are used to study different levels of complexity. Also each level can be described only using specific subjects as the passage says that "each level can be described in terms of concepts relevant to its own particular structure". The higher and lower levels are to certain degree independent of each other. This can be inferred from the passage as it says that "biologists don't need to study quantum field theory". Hence, this is the correct option.
Option B: A complex system consists of hierarchies which is made up of different layers. But the statement given in the question is not to emphasize this aspect of complex systems. It is to explain the independence of the languages used to describe each level.
Option C: Understanding causes and effects at higher levels does not require expertise in various subjects. The laws governing complex systems is to a large extent independent of the low-level physics. Hence, this option is incorrect.
Option D: The statement is not made to emphasise the importance of physics as compared to biology and chemistry. The statement only implies their independence.
Hence, option A is the correct answer. Choice (A)

95. The passage says that we do not have reliable "phenomenological laws at the levels of psychology and sociology". In the fourth paragraph, the passage states that "causes at those higher levels in the hierarchy of complexity have real effects at lower levels" because of which physics is not able to predict what we see in the world around us.
Option A: The reductionist approach tends to study causal elements "in isolation". This is one of the reasons why physics cannot predict individual and social behaviour.
Option B: The new properties at higher levels "cannot be fully explained by breaking that order down into its component parts". Hence, this is also one of the reasons why physics cannot predict individual and social behaviour.
Option C: The interplay at higher complexities cannot be studied by physics because the laws of physics only deal with low level systems. Hence, this is also one of the reasons why physics cannot predict individual and social behaviour.
Option D: If the laws governing complex systems emerge from lower level component parts, then predicting higher level behaviour would be possible. However, the passage mentions that laws governing higher level systems are "to a large degree independent" of the low level laws.
Hence, this statement is not a reason why physics cannot predict behaviour.
Therefore, the correct answer is option D. Ans: (D)

96. The limitation of the reductionist approach is that it ignores the interactions at higher levels that can "trigger the emergence of order, pattern".
Option A: Reducing the complexity of the system need not necessarily result in this limitation if the higher level interactions are considered when studying low level causes and effects.
Option B: Ignoring the complex interaction is a consequence of the shortcoming of the reductionist approach and not the source of the shortcoming. Hence this option is incorrect.
Option C: The passage states that "Physicists reduce matter first to molecules, then to atoms, then to nuclei and electrons, and so on, the goal being always to reduce complexity to simplicity. The extraordinary success of that approach is based on the concept of an isolated system" and follows that with "the problem is that no real physical or biological system is truly isolated" because if which reductionism "tends to ignore the kinds of interactions that can trigger the emergence of order, patterns". Hence, this is the source of the shortcoming in reductionist approach.
Option D: Ignoring the relation between sciences cannot be said to be the source of this shortcoming as it cannot be inferred from the passage.
Hence, option C is the correct answer. Choice (C)

Solutions for questions 97 to 100:

97. The sentence has errors related to rhetorical construction, logical predication, grammatical construction, idiomatic usage. The sentence tells us that both the presidential candidates are hated by the voters and still there is a winning candidate, who wins because he is viewed as the lesser of two evils. The given sentence is not the most effective construction. Choice A has a rhetorical construction error and 'who does so' is ambiguous. There's no correct verb reference here. 'is a winning candidate' cannot be implied with 'does so'. It would have been correct if 'wins' replaced 'does so'. The part should read: ..... and

yet there's a winning candidate who wins ..... Also there is an error related to subject-verb agreement. The verb 'views' is incorrect. 'majority' is a plural noun in this context (since we're speaking of voting individuals), and requires a plural verb 'view'. Choice B changes the meaning. The voters choose him because they view him as the lesser of the two evils. The sentence is the author's opinion about the winning candidate being the lesser of the two evils. Choice C is incorrect as the relative clause starting with 'who' is a non-restrictive one. Hence, it should be separated by commas. The part should read: ..... the majority, who view one candidate as the lesser of the two evils, choose him ..... Also, the passive 'are equally hated' is not warranted. Choice D is correct and concise. Choice (D)

98. The sentence has errors related to logical predication and modifier. Since the subject talks about what Bitcoin is intended to be, it should be put across in the infinitive, which would be the most appropriate. "As" is used for comparison and thus cannot be used in this context. The relative clause "that point to rampant speculation" seems to modify "daily volume surges" whereas it is intended to modify the whole group of words starting from "amid worries about....". The position of "subject to" gives the impression that local currency devaluation is subject to volatile price hikes and daily volume surges. "Designed to be a global currency" is wrongly followed immediately by "countries" giving the impression that countries are intended to be a global currency.
In choices B and D, it is not clear what is "pointing to rampant speculation in Bitcoin", whether it is the vulnerability of the Bitcoin or the related events mentioned in the statement. This is made clear by the construction ".... worries about local currency devaluation and the rampant speculation in Bitcoin as evidenced by the volatile price spikes and daily volume surges" as given in choices A and C. But only choice A is completely correct. The modifiers are used in the right parts of the sentence. The wordy construction in the question statement "Have the Bitcoin gaining in ground" has been replaced by the more concise construction "Bitcoin is gaining in ground". Choice C has a modifier error. "Argentina and Kenya" (after the word 'currency') gives the impression that these countries are a currency. In choice D, "designed as" is awkward and inappropriate. Choice (A)

99. The sentence has errors related to tenses, modifiers, rhetorical construction and grammatical construction. 'that was in a running condition' applies to the car and not the lady. This modifier error exists in the given sentence and in choice C. Also, the buying of the car must have taken place before the selling. Therefore 'buy' must have the 'past perfect tense' and 'sell' must have the 'simple past tense'. Also, the passive voice 'was sold' (as given in the question) is not necessary. Active voice is correct. That "the car was bought when it was in a good condition" is additional and so the relative clause is a non-restrictive one. Therefore, we should not use 'that'. 'which' is correct. All these are taken care of in choice B. In choice A, the past perfect tense is missing. In choice C, the modifier error exists. In choice D, 'that' is incorrect ('which' should be used) and the part 'in running condition' (referring to the car) needs to be preceded and succeeded by commas. Choice (B)

100. The given sentence has errors related to parallelism and punctuation. 'The college' is incorrect. We are not referring to a particular college but we are referring to 'college' in general. So 'a college' should be used at the start of the sentence. {'prison house' would refer to ignorance or the limitations of our prejudice. The battle refers to one of the battles. The sentence implies that one will go through many battles. Existence of college life is one such battle} We need to say, "The battle is not yet lost" since the other parts have the word 'yet' in them. The present perfect "battle has not yet been lost" is incorrect (in choices A and D) as it is not parallel to "hope has not yet died" and "the prison house has not yet closed". Also in the final part, the word 'here' has to be placed before "we assert, endow and defend as final reality.....". 'where' in choice A is incorrect inspite of the semicolon before it. Without the semicolon, it would have been wrong altogether. 'in final reality' in choice D is incorrect. With respect to punctuation, we would also need to introduce a semicolon after the word 'lost'. (We want to bring in another statement to be seen with an earlier one but it is an independent thought. We have ended a thought and are starting a new thought with a different emphasis). So the correction is, "A college is a corner of our hearts where hope has not yet died, the prison house has not yet closed, the battle is not yet lost; here we assert, endow and defend as final reality, the best of our dreams." In choice B, the presence of a comma after 'hearts' and the absence of a semicolon after 'lost' renders it incorrect. Only Choice C is free from errors and provides the correct sentence construction. Choice (C)

Difficulty level wise summary - Section II	
Level of Difficulty	Questions
Very Easy	–
Easy	77, 81, 83, 88
Medium	69, 70, 71, 72, 73, 78, 79, 82, 84, 85, 86, 90, 94, 95
Difficult	67, 68, 80, 87, 89, 91, 92, 93
Very Difficult	74, 75, 76, 96, 97, 98, 99, 100