2B

SOLUTIONS

SNAP 2011

41. Let us solve the problem by eliminating the options.
G: People are rewarded.
C: If people are rewarded then they will not change their lifestyle.
F: Unless people change their lifestyle, temperature rises.
This can also be put in the following manner.
If people do not change their lifestyle then temperature rises.
This is an example of binary logic – If not A then B which can also be expressed as If not B then A.
Thus if the temperature doesn't rise then people change their lifestyle.
Here, according to G and C, people do not change their lifestyle and so temperature rises.
D: If temperature rises, then water level in the coastal area rises.
H: Water level in the coastal area doesn't rise.
Here, D is in accordance with G, C and F but H is not.
So option 1 is incorrect.
B: People change their lifestyle only if they are rewarded.
This means that if people have changed their lifestyle then they have been rewarded.
Note that if people are rewarded, they may or may not have changed their lifestyle.
G: People are rewarded.
From B and G, we don't know whether people have changed their lifestyle or not.
F: Unless the people change their lifestyle, temperature rises.
This can also be put as – If the people don't change their lifestyle then temperature rises.
But as we don't know whether people have changed their lifestyle or not, we cannot conclude whether temperature has risen or not.
D: If temperature rises, then water level in the coastal area rises.
H: Water level in the coastal area doesn't rise.
As we don't know whether temperature has risen or not, H cannot be concluded using D.
Hence, option 2 is also incorrect.
E: Whenever the water level in the coastal areas rises, then the temperature rises.
H: Water level in the coastal area doesn't rise.
Thus from these two statements the temperature may or may not rise.
While discussing the previous option, we have proved that from statements B, F and G we also come to the same conclusion that the temperature may or may not rise.
Hence, statements E, F,G, H and B are consistent with each other.
Hence**, option 3.**

42. In option 2, statement A says – If Kumar sings then the audiences sleep.
Out of the other 4 statements C, F, G and H, none of the statements mention anything about sleep and hence option 2 is incorrect.
If option 2 is incorrect, option 4 is also incorrect as it mentions both 2) and 3).
C: Unless audience does not dance, the concert will be successful.
This can also be put as – If the audience dance, the concert will be successful.
F: Kumar sings, only if Vina dances.
This means that – If Kumar has sung, then Vina has danced.
But if Vina has danced, Kumar may or may not have sung.
B: If Kumar sings, then the audience dances.
We don't know whether Kumar has sung or not and so we don't know whether the audience have danced or not.
Hence we cannot conclude that the concert is successful as given in statement H.
So option 1 is also logically incorrect.
E: If Vina dances, then Kumar sings.
G: Vina dances.
Thus from these two statements we know that Kumar sings.
B: If Kumar sings, then audiences dance.
Thus audiences have danced.
C: Unless audience does not dance, the concert will be successful.
This can also be put as – If the audience dance, the concert will be successful.
Thus the concert is successful as mentioned in statement H.
Hence, **option 3.**

43. The person with both statements true will be the one whose statements help establish the relationships between all 4 members and especially between B and C. This is because one of the questions explicitly asks

for the relationship between B and C and there is no answer option such as "None of the above" or "Data Insufficient".

Consider A: B is A's son and D is A's mother. However, there is no information about C. Therefore, the relationship between B and C cannot be established. Therefore, both of A's statements cannot be true.

Consider B: B is C's husband and D is B's father. However, there is no information on A. A could be B and C's child or B's sibling. Therefore, both of B's statements cannot be true.

Consider C: D is C's mother-in-law and A is C's daughter. Since the family has only four members, B has to be C's spouse. Thus, the overall relationship between the four members is known. It is also known that B and C are a couple. However, it cannot be said whether B is the husband or wife of C. Therefore, both of C's statements also cannot be considered true.
Consider D: A is D's grand-daughter and B is D's daughter-in-law. Again, since there are only 4 members in the family, C should be B's husband, D's son and A's father.
Thus, D is the grand-parent, B and C are the couple where C is the husband and A is the grand-daughter. Thus, D's statements give the overall relationships as well as the specific relationship between B and C. Therefore, D is the person who always speaks the truth.
Hence, **option 4.**

44. Consider the solution to the previous solution.
B is C's wife.
Hence, **option 3.**

45. Consider each option.
D is either A's grandfather or grandmother. Since D always speaks the truth, option 3 may or may not be true (depending on the gender of D) while option 1 is definitely false.
B is C's wife. Based on the fact that both of D's statements are true, both of B's statements turn out to be false. Therefore, option 2 is also false.
A is B's daughter. Based on the fact that both of D's statements are true, both of A's statements turn out to be false.
Thus, B's daughter always tells lies.
Hence, **option 4.**

46. Observe that the question states that the cube is kept in the corner of the room. Assume that opposite faces are painted red, blue and green. Since the cube is in the corner, one red, blue and green face each will be adjacent to the two walls and floor and will not be painted. Thus, there are only three faces that are painted. Since the cube is cut into 343 identical cubes, it means that each face is cut into 7 equal layers along each dimension. Thus, there are 7 similar layers along the length, breadth as well as height. Since only one face is painted along each dimension, if we remove one layer each along the length, breadth as well as height, the remaining 6 layers in each dimension will be unpainted.
Therefore, number of cubes that have no face painted
$= 6 \times 6 \times 6 = 216$
Hence, **option 4.**

47. Consider the 3 faces that are painted. Let us first count the number of cubes that have at least one colour painted on them.
Consider the top face. Assume it is painted blue. It will have $7 \times 7 = 49$ cubes with atleast one colour on them.
Now, consider the front face. Assume it is painted red. It will also have 49 cubes with atleast one colour. However, the top 7 cubes on this face are also common to the top face and have been counted once.
So, number of cubes to be considered from front face
$= 7 \times 6 = 42$
Finally, consider the side face which will be painted green and which will also have 49 cubes with atleast one colour.
However, it also has 7 cubes common to the top face, 7 cubes common with the front face and 1 cube common to both the top and front face.
So, number of cubes to be considered from side face
$= 49 - (7 + 7 - 1) = 36$
So, number of cubes with atleast one colour on them
$= 49 + 42 + 36 = 127$
Now, there are 7 cubes common to the top and front face. Similarly, there are 7 cubes common to the front and side face as well as 7 cubes common to the top and side face. Here, the cube at the intersection of all three faces will have red, blue as well as green colour, while the remaining 6 faces in each case will have a red-blue or red-green or blue-green combination.
Thus, there is only 1 cube that is painted in 3 colours while there are 6×3 i.e. 18 cubes that are painted in exactly 2 colours.
So, number of cubes that have exactly one colour on them $= 127 - (1 + 18) = 108$
Hence, **option 1.**

48. Number of cubes that have at the most 2 faces painted = Total number of cubes – Number of cubes that have 3 faces painted.
From the solution to the previous question, number of cubes that have at the most 2 faces painted $= 343 - 1$
$= 342$

Hence, **option 2.**

49. After driving 3 km north, 3 km west and 4 km south, Amit is 1 km to the south and 3 km to the west of his starting point. So he will have to move 1 km north and 3 km east to reach the point from where he started.
Hence, **option 2.**

50. As stated in the solution of Q. 49, Amit will reach the starting point if he moves 1 km north and 3 km east. If he moves 1 km north and 4 km east, he will be 1 km away from his starting point.
Hence, **option 3.**

51. X = XY and Y = Y + 1 is the process that takes place in every step and the machine stops at X ≥ N
Input: X = 3, Y = 2 and N = 100.
Step 1: X = 6, Y = 3
Step 2: X = 18, Y = 4
Step 3: X = 72, Y = 5
Step 4: X = 360, Y = 6
Thus it takes 4 steps before the machine stops.
Hence, **option 3.**

52. In Q. 51, the value of X becomes 360.
Hence, **option 4.**

53. In Q. 51, the value of Y becomes 6.
Hence, **option 3.**

54. If N = 500, then by using the solution of question 51, we can further calculate Step 5 as follows:
Step 5: X = 2160, Y = 7.
Thus value of X will be 2160.
Hence, **option 4.**

55. Input: X = 2, Y = 3
Step 1: X = 6, Y = 4
Step 2: X = 24, Y = 5
Step 3: X = 120, Y = 6.
Thus for any value of N greater than 120, the value of Y will become 7.
The correct answer should be 121.
Since, the answer closest to 121 here is 300, it is the correct answer.
Hence, **option 1.**

56. Vicky always score more than Priya and Priya always scores more than Ankit.
Thus Vicky's rank is always numerically lower than Priya's and Priya's rank is always numerically lower than Ankit's.
Either of the following two situations take place.
If Raman scores the highest, then Tony scores the least or if Sunil scores the highest, then Deepak or Ankit scores the least.
Thus if Raman is ranked 1st, then Tony is ranked 7th and if Sunil is ranked 1st then either Deepak of Ankit is ranked 7th.
The question states that Sunil is ranked 6th and Ankit is ranked 5th.
Thus Raman is ranked 1st and Tony is ranked 7th.
So the following situations are possible for ranks 2, 3 and 4.
2 – Vicky, 3 – Priya, 4 – Deepak or
2 – Vicky, 3 – Deepak, 4 – Priya or
2 – Deepak, 3 – Vicky, 4 – Priya.
Vicky can never be 1st, Raman will never be 2nd or 3rd, Tony is ranked 7th and hence cannot be 4th or 5th.
Deepak can be 3rd or 4th according to the above obtained conditions.
Hence, **option 4.**

57. If Raman gets the highest, he will be ranked 1st. Accordingly, Tony will be ranked 7th.
Now Priya and Ankit are always ranked numerically higher than Vicky.
Hence, Vicky can never be ranked lower than 4th as if he is ranked 5th then there will not be enough positions to accommodate both Ankit and Priya.
Hence, **option 3.**

58. The question states that Ankit is ranked 1st.
This is not possible as he always scores less than Vicky and Priya.
Hence, **option 4.**

59. If Sunil is ranked 2nd, then Raman is ranked 1st and Tony is ranked 7th.
Vicky's lowest numerical rank will be 3rd and so he will always get less than Sunil.
Raman is ranked 1st and so Priya will always get less than Raman.
Vicky scores more than Priya is given in the question data.
Hence by eliminating the options, we can conclude that it is possible for Deepak to get more than Vicky.
Hence, **option 1.**

60. If Vicky is ranked 5th, then Priya is ranked 6th and Ankit is ranked 7th.
Thus Sunil is ranked 1st.
Hence, **option 1.**

61. The conclusion is that Party Z is likely to win the next election. A weakening statement would have to show party Y having a favourable advantage or party Z having a clear disadvantage.
Option 1 is loose and does not provide anything concrete.

Option 2 shows the percentage of people voting from each party but fails to bring out the vantage point of a single party.
Option 4 does not weaken the conclusion.
Option 3 clearly states a percentage of people in favour of party Z, wich is less than 50%.
Hence, the correct answer is **option 3.**

62. The information given to us is about inflation rising in quarters of a year.
Option 1 talks about the RBI taking "necessary measures" which is ambiguous.
Option 2 and 3 do not provide a strong explanation for the question.
Option 4, is right on target. It talks about the quarterly increase in inflation and is in line with the information given.
Hence, the correct answer is **option 4.**

63. Birth (positive connotation) - The act or process of bearing young; Dirge(negative connotation) - A funeral hymn or lament
Similarly: Marriage - is a social union or legal contract; alimony - allowance made to a wife out of her husband's estate or income for her support, upon her divorce.
Options 1, 2 and 4 do not have the same relation between the two words.
Hence, the correct answer is **option 3.**

64. The reasoning in the main statement is that, 'because beaches are beautiful, they are crowded'.
i.e. it is a 'Because A therefore B' type of a statement.
Option 1 only states that Moose and bear grow thirsty at the same time, it does not give a reason for this.
Option 2 shows an 'If not A then B' type of relationship.
Option 3 does not show a relationship between two variables.
Option 4, shows a similar relation to the one described in the main statement.
Hence, the correct answer is **option 4.**

65. Option 1 is incorrect as there is no available measure for underground industries.
Option 2 assumes that all self-employed industries are not underground, which is erroneous.
Option 3 states that industries 'except for self-employed ones' may be running underground. This is a wrong conclusion.
Option 4 is correct. The latter statement states that some self-employed industries are included in national productivity measures and only non-underground industries are included in national productivity measures.
Hence, the correct answer is **option 4.**

66. This statement has an underlying assumption that 'receiving a violation from the FAA is a hindrance to an excellent performance record'.
Hence, the correct answer is **option 3.**

67. The example of Tom Hanks is specific. It is just one case upon which the broad conclusion of 'death penalty not serving as a deterrent to murder' has been made.
Hence, the correct answer is **option 3.**

68. The number at the center of each row is the sum of the rest of the numbers divided by 2.
In the first row the central number is 3 which is (4 + 2)/2
In the second row the central number is 5 which is (5 + 3 + 1 + 1)/2
Similarly, the central number in the last row is (9 + 3)/2 = 6
Hence, **option 4.**

69. The latter part of the information states that removal of restrictions such as the ones including fee arrangements for advertisements will cause reduction in overall consumer legal costs and the former part of the information states that fewer restrictions on advertising will lead to an increase in lawyers advertising for their services.
Only option 3 captures the essence of the information.
Hence, the correct answer is **option 3.**

70. The information clearly mentions that those lawyers who advertise for their services charge lesser than those who do not advertise. Option 4 contradicts this and weakens the argument concerning consumer legal costs.
Hence, the correct answer is **option 4.**

71. Speed of train = 36 kmph = 36 × 5 /18 = 10 m/s
Let the length of the platform be P and length of the train be T.
Now, the train crosses the platform in 20 seconds and the man in 10 seconds.
Hence, the train traveled P + T in 20 seconds and T in 10 seconds.
Hence, it traveled P distance in 20 – 10 = 10 seconds.
Hence, P = 10 × 10 = 100 meters.
Hence, **option 2.**

72. Let t be the usual time taken by the man.
Now, if he travels at $4/5^{th}$ of his usual speed then time taken by him will be $5/4 \times t$
Hence, $5/4 \times t = t + 10$
Hence, $t = 40$
Hence, **option 2.**

73. Relative speed of man and woman is 9 kmph.
Hence, time required to cover 81 km = 81/9 = 9 hours.

In 9 hours, the woman will travel 9 × 4 = 36 km.
Hence, **option 2.**

74. Assume that one of them walked 6 km towards east and then 8 km south.
Hence, he is 6 km east and 8 km south of the original position.
Hence, he is $\sqrt{(6^2 + 8^2)}$ = 10 km from his original position.
Similarly, we can prove that the other person is also 10 km from his original position.
Hence, **option 2.**

75. Let a man take m days and a woman takes w days to complete the work.
Hence, we have,

$$\frac{4}{m}+\frac{3}{w}=\frac{1}{6} \quad \text{... (I)}$$

$$\frac{5}{m}+\frac{6}{w}=\frac{1}{4} \quad \text{... (II)}$$

Solving I and II, we get,
m = 36 and w = 54
Hence, 2 women and 3 men will complete;
2/54 + 3/36 = 13/108
Hence, they will complete the work in 108/13 = 8.3 days
Hence, **option 3.**

Note: In actual paper, all the options were incorrect. Hence, we have changed one of the options to include the correct answer.

76. Ram completes 60% of the work in 15 days.
Hence, he will take 25 days to complete the work.
Now, Rahim is 50% as efficient as Ram, and Rachel is 50% as efficient as Rahim, hence Ram, Rahim and Rachel together will complete;

$$\frac{1}{25}+\frac{1}{50}+\frac{1}{100}=\frac{7}{100} \text{ of the work in one day.}$$

Hence, they will complete the work in 100/7 days.
Hence, they can complete the remaining 40% work in

$$0.4 \times \frac{100}{7}=\frac{40}{7} \text{ days.}$$

Hence, **option 3.**

Note: In actual paper, all the options were incorrect. Hence, we have changed one of the options to include the correct answer.

77. In 9 days, B will do 9/24 = 3/8 of the work.
Hence, A and B together did 1 – 3/8 = 5/8 of the work together.
Now, A and B can complete;

$$\frac{1}{21}+\frac{1}{24}=\frac{5}{56} \text{ of the work in one day.}$$

Hence, they will complete, 5/8 of the work in;

$$\frac{5}{8}\times\frac{56}{5}=7 \text{ days.}$$

Hence, **option 4.**

78. Let selling price of each article be 1.
Hence, selling price of 100 article = 100
Hence, profit = 75
Hence, cost price = 100 – 75 = 25
Hence, percentage profit = 75/25 × 100 = 300%
Hence, **option 3.**

79. Let V_a and V_b be the speed of A and B respectively.

$$\therefore \frac{V_a}{100}+5=\frac{80}{V_b} \quad \text{... (I)}$$

$$\frac{V_a}{100}=\frac{60}{V_b} \quad \text{... (II)}$$

Solving I and II, we get,
V_b = 4, V_a = 100/15
Hence, A will take;

$$\frac{200}{\frac{100}{15}}=30 \text{ seconds}$$

Hence, **option 3.**

80. Surface area of the original cube = 4 × 4 × 6
= 6 × 16 cm^2
Now, there will 64 new cubes of side 1 cm.
Hence, surface area of these 64 cubes = 64 × 6 cm^2
Hence, percentage increase in surface area is;

$$\frac{64\times 6-16\times 6}{16\times 6}\times 100=300\%$$

Hence, **option 2.**

81. G236G0 is divisible by 36
Hence, G236G0 is divisible by 9 and G is an even number.
Hence, G + 2 + 3 + 6 + G + 0 = 2G + 11 is divisible by 9.
Only G = 8 satisfies the given condition.
Hence, **option 1.**

82. In one day, Amit and Sagar can do;

$$\frac{1}{12}+\frac{1}{15}=\frac{3}{20} \text{ of the work in one day.}$$

Hence, in 4 days they will complete 3/5th of the work.
Hence, amount of work remaining after 4 days

$$=1-\frac{3}{5}=\frac{2}{5}$$

Hence, **option 3.**

83. Let the width of the road be d.
Hence, Area of lawn = Area of park – Area of road
$= 2400 – (40d + 60d – d^2)$
Hence, $2109 = 2400 – 100d + d^2$
Hence, $d^2 – 100d + 297 = 0$
Hence, $d = 97$ or $d = 3$.
Hence, **option 2.**

84. Probability of choosing either bag is 1/2.
Now, from the first bag, we can choose one white and one black ball in $5 \times 3 = 15$ ways.
While, two balls can be selected in ${}^8C_2 = 28$ ways
Hence, probability that the two ball chosen are of different color = 15/28
Similarly, we can prove that the probability that two balls chosen from the second bag are of different color = 20/36
Hence, the required probability

$$= \frac{1}{2} \times \frac{15}{28} + \frac{1}{2} \times \frac{20}{36} = \frac{275}{504}$$

Hence, **option 1.**

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85. Consumption = Production – Exports
Per Capita Consumption = Consumption/Population
∴ Population = Consumption/Per Capita Consumption
Thus, the consumption and population for each year can be calculated as shown in the table below:

Year	Production	Exports	Consumption	Per Capita consumption	Population	% Increase in Consumption	Exports/Consumption
2006	186.5	114	72.5	36.25	2.00		1.57
2007	202	114	88	35.2	2.50	21.38	1.30
2008	238	130	108	38.7	2.79	22.73	1.20
2009	221	116	105	40.5	2.59	(2.78)	1.10
2010	215	88	127	42	3.02	20.95	0.69

Thus, the percentage increase in the consumption of rice was the highest in 2008.
Hence, **option 2.**

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86. Consider the table obtained in the solution to the first question.
The population of country A in 2008 was 2.59 million.
Hence, **option 3.**

87. Consider the table obtained in the solution to the first question.
As can be seen, the ratio of consumption to exports in the given period was highest in 2006 (1.57).
Hence, **option 1.**

88. Consider the table obtained in the solution to the first question.
The population of country A was the highest in 2010 (3.02 million).
Hence, **option 4.**

89. The percentage of time spent in school is

$$\frac{105}{360} \times 100 = 29.17\% \approx 30\%$$

Hence, **option 2.**

90. Since the angle subtended by "games" is 30° while that subtended by "sleeping" is 120°, the required percentage is (30/120) × 100 i.e. 25%
Hence, **option 3.**

91. Since the student spends an equal time in games and home work, he can either increase the time spent on games or decrease the time spent on home work.
It is also given that the time spent on other activities remains constant while the decrease in time spent on sleeping is to be found.
This can only happen if the time spent on games has increased.
So, the angle subtended for games should increase from 30° to 45°. If this happens, the angle subtended for sleeping will decrease from 120° to 105°.

$$\therefore \text{Percentage decrease} = \frac{(120 - 105)}{120} \times 100$$

=12.5%
Hence, **option 2.**

92. Difference in time spent in school and home work is

$$\frac{(105 - 45)}{360} \times 24 = 4 \text{ hours}$$

Hence, **option 3.**

93. Time spent on home work $= \frac{45}{360} \times 24 = 3$ hours

Out of this, one-third i.e. one hour is spent on Mathematics.
So, the remaining two hours are spent on the rest of the subjects.
Hence, **option 2.**

94. In the given diagram,

$$\frac{AB}{BC} = \frac{DE}{EF}$$

Substituting value of AB, BC abd DE, we get,
EF = 2 × 1.5 = 3
Hence, **option 2.**

95. Log 10 + log 10^2 + … + log 10^n = 1 + 2 + … + n
= $n(n + 1)/2$
Hence, **option 4.**

96. Let a be the required number.
Hence, we have;

$$\left(a + \frac{1}{a}\right) = 3\left(a - \frac{1}{a}\right)$$

Hence, $a^2 = 2$
Hence, $a = \pm\sqrt{2}$
Hence, **option 1.**

97. Smallest and largest numbers, in the given region, which are divisible by 9 are 18 and 297 respectively.
Hence, the required number = (297 – 18)/9 + 1 = 31 + 1 = 32
Hence, **option 1.**

98. ${}^nC_x = \frac{n!}{x!\,(n - x)!} = 56$

${}^nP_x = \frac{n!}{(n - x)!} = 336$

Hence $x! = 6$
Hence, $x = 3$
Hence, from the given options, n can be either 7 or 8.
But ${}^8C_3 = 56$
Hence, **option 3.**

99. Perimeter of the largest equilateral triangle is 72cm
Now, triangle formed by joining the midpoints will have perimeter half of that of original triangle.
Hence, the required sum is;
72 + 36 + 18 + … upto infinite terms
This is nothing but an infinite GP, with

common ratio $= \frac{1}{2}$

Hence, the required sum $= \left(\frac{72}{1 - \frac{1}{2}}\right) = 144$

Hence, **option 1.**

100. In a leap year, there are 366 days.
Now, 366 (mod 7) ≡ 2 (mod 7)
This implies that if year started on Monday then it will end on Tuesday, and so on.
And also the first day of the year will definitely appear for 53 times in the calendar.
Hence, if year starts on Saturday, Sunday or Monday then it will definitely contain either 53 Sundays or 53 Mondays.
Now, a leap year chosen can start from any of the seven day.
But it will contain 53 Monday or Sunday only if it starts on Saturday, Sunday or Monday.
Hence the required probability = 3/7
Hence, **option 3.**

101. $3x + 4y = 12$
Hence, $x/4 + y/3 = 12$
This is nothing but the intercept form of the equation of a line.
Hence, intercept are 4 and 3.
Hence, **option 2.**

102. a and d are equidistant from 36.
This implies that average of a and d is 36.
Hence, $a + d = 72$
Similarly, we have,
$b + c = 68$, $a + b = 60$ and $c + d = 80$
Now, a < b and a + b = 60
Hence, $a < 30$ and $b > 30$
Similarly,
$b < 34$ and $c > 34$
And $c < 40$ and $d > 40$
Now, only primes which satisfy this conditions are,
$a = 29$, $b = 31$, $c = 37$ and $d = 43$
Hence, $d - a = 43 - 29 = 14$
Hence, **option 2.**

103. After selling at Rs. 15/kg, Ramsukh earns a profit of 66.66%.
Hence, cost price of Rasgulla is Rs. 9/kg.
Now, ratio of flour and sugar is 5 : 3.
Hence, 1 kg of rasgulla is made up of 5/8 kg of flour and 3/8 kg of sugar.
Let price of 1 kg of flour = $3k$
Hence, price of 1 kg of sugar = 7k
Hence price of 1 kg of Rasgulla is;

$$\frac{3}{8} \times 7k + \frac{5}{8} \times 3k = 9$$

Hence, $k = 2$
Hence, cost price of sugar = $7k = 7 \times 2$ = Rs. 14/kg
Hence, **option 4.**

104. Let cost price of sugar be x.
Hence, reduced cost price = $0.8x$
Hence, $240/x + 6 = 240/0.8x$
Hence, $300/x = 240/x + 6$
Hence, $60/x = 6$
Hence, $x = 10$
Hence, **option 1**.

105. Volume of a solid sphere is given as $\frac{4\pi r^3}{3}$ where r is the radius of the sphere.

Volume of a right circular cone is $\frac{\pi r^2 h}{3}$ where r is the radius of the base of the cone and h is the height of the cone. The solid sphere is recast into a right circular cone with base radius equal to the radius of the sphere.

Thus $\frac{4\pi r^3}{3} = \frac{\pi r^2 h}{3}$

Hence, $h = 4r$
Thus the ratio of the height to the radius is 4 : 1.
Hence, **option 4.**

106. Assume that the scooter, the car and the train travel 16 km.
Let their speeds be 1 kmph, 4 kmph and 16 kmph respectively.
Thus time taken by the scooter, the car and the train is 16 hours, 4 hours and 1 hour respectively.
Ratio of time taken to the velocity of each vehicle will be
(16/1) : (4/4) : (1/16) = 16 : 1 : (1/16) = 256 : 16 : 1
Hence, **option 1.**

107. A can do a piece of work in 15 days.
B is twice as efficient as A.
So B can do the same piece of work in 7.5 days.
Assume that there is 15 units or work to be done.
A does 1 unit per day and B does 2 units per day.
For the first x days, A worked alone and hence work done per day is $1 \times x = x$ units.
For the next $(11 - x)$ days, A and B worked together. In 1 day, they do (1 + 2) = 3 units.
So in $11 - x$ days, they do $33 - 3x$ units.
$33 - 3x + x = 15$
Thus $2x = 18$ and $x = 9$.
Thus A worked alone for 9 days the A and B worked together for 2 days.
Hence, **option 2.**

108. Let the contributions of A, B, C and D in purchasing a restaurant be a, b, c and d respectively.
Thus $a + b + c + d = 5600000$ ... (1)
$b + c + d = 4.6a$ ... (2)
$a + c + d = 3.666b$ ... (3)
$0.4(a + b + d) = c$
$a + b + d = 2.5c$ ... (4)
Using (1) and (2) we get
$a = 5600000/5.6 = 1000000$ ... (5)
Using (1) and (3) we get $b = 5600000/4.66$
$= 1201716.73$ ... (6)
Using (1) and (4) we get
$c = 5600000/3.5 = 1600000$ ... (7)
Using (1), (5), (6) and (7), we get $d \approx 1800000$
Hence, **option 4.**

109. Let the salary of Saroj be Rs. 100.
Salary of Raju and Ram is 20% and 30% less than Saroj's salary.
Hence, Raju's salary is Rs. 80 and Ram's salary is Rs. 70.
Thus Raju's salary is greater than Ram's salary by

$$\frac{80 - 70}{70} \times 100 = 14.28\%$$

Hence, **option 4.**

110. Let the radius of the wire be r and its length be l.
A wire is cylindrical in nature where the length is considered to be its height.
Hence volume of this wire is $\pi r^2 l$
The modified radius is one-third of the original radius.
Thus $r' = r/3$
Let the modified length be l'
As the volume remains constant,

$$\pi r^2 l = \pi \left(\frac{r}{3}\right)^2 l'$$

Hence, $l' = 9l$
Thus the modified length is 9 times the original length.
Hence, **option 4.**

111. Victory is the synonym of triumph.
Hence, the correct answer is **option 4.**

112. Consider the fourth sentence in the paragraph: 'But the magnificent here and now.....ours only for a time'. This line validates what is mentioned in option 3.
Hence, the correct answer is **option 3.**

113. Rapture means 'extreme joy; being transported by a lofty emotion; an expression of ecstatic feeling'.
Hence, the correct answer is **option 4.**

114. The sun's **reflection** is seen on the surface of the water.
Hence, the correct answer is **option 4.**

115. The passage is pertaining to 'the rational investigation of truth and principles of being, knowledge or conduct'. This is characteristic of a philosophical approach/tone.
Hence, the correct answer is **option 4.**

116. The passage talks about the gift of life and how one must make the most of it. Option 4 is a befitting title.
Hence, the correct answer is **option 4.**

117. Redundancy can be defined as: 1. The state of being repetitive or no longer needed
2. Superfluous repetition or overlapping, especially of words.
Hence, the correct answer is **option 1.**

118. The relationship conveyed is that of 'material - object that utilizes the material - where the final result is seen'
This correlation is seen in option 4.
Hence, the correct answer is **option 4.**

119. Realia can be defines as: 1. Objects like coins, tools, etc. used by a teacher to illustrate everyday living.
2. Things which are real.
Hence, the correct answer is **option 3.**

120. In sentence 1, 'Are' is used erroneously. It is the present indicative plural of 'be'.
In sentence 2, 'Does' and 'this 'are incorrect as gloves are plural. 'Does this **pair of** gloves' is correct
In sentence 3, 'belongs' is incorrect. It should be used with singular nouns/pronouns eg. It belongs to you.
Sentence 4 is grammatically correct.
Hence, the correct answer is **option 4.**

121. In the first sentence, "I live…..countryside", the nouns 'house' and 'street' require an indefinite article (the nouns are not particular or specific ones). Hence, options 2 and 3 are ruled out.
Between sentences 1 and 4, 1 is error-free. The noun 'house' in the latter part of the sentence requires a definite article as it is talking about a specific 'old house'.
Hence, the correct answer is **option 1.**

122. In sentence 1, the preposition 'to' is incorrect. One uses 'to' only in case of similarities. For example: She is similar to me. Her teaching method is similar to mine.
In sentence 2, 'for' is erroneous. It is incorrect usage.
Between options 3 and 4, option 4 mentions 'compare **their** teaching method with **their** own'. This is erroneous.
Option 3 is grammatically correct.
Hence, the correct answer is **option 3.**

123. Option 1 uses the word 'that' which is appropriate to introduce the restrictive relative clause "you filled out……which was sent?"
Hence, the correct answer is **option 1.**

124. In sentence 1, 'have' denotes the simple present tense which is incorrect as the word 'yesterday' is in the past. When the word 'did' is used in a sentence, it must be followed with the stem of the verb. i.e. 'Did complete'. Hence, this statement is erroneous.
In sentence 3, 'have had' indicates the perfect present tense which is incorrect.
Hence, the correct answer is **option 4.**

125. 'Crashed into' is the correct phrase.
Hence, the correct answer is **option 2.**

126. Here, 'referred to' indicates something 'also known as' or 'described as' something else.
Hence, the correct answer is **option 1.**

127. In this context the word to replace independent would be impartial which means 'unbiased; independent of bias; neutral'.
Self-centred means concerned solely or chiefly with one's own interests
Self-seeking means the seeking of one's own interest or selfish ends
Self-possessed means having full possession of ones faculties
Hence, the correct answer is **option 2.**

128. To 'deter' means to 'discourage or prevent'.
Hence, the correct answer is **option 2.**

129. 'Grievance' can mean the following:
1. suffering; distress
2. a cause of distress (as an unsatisfactory working condition) felt to afford reason for complaint or resistance
3. the formal expression of a grievance : complaint
Hence, the correct answer is **option 1.**

130. 'Ombudsman' can mean the following:
1. a government appointed to receive and investigate complaints made by individuals against abuses or capricious acts of public officials
2. one that investigates, reports on, and helps settle complaints
Hence, the correct answer is **option 1.**

131. The sentence does not require the word 'about'. It can be written as '…to discuss in detail the assorted problems that people have been facing for a long time'. We discuss a/the problem and not discuss about a problem.
Hence, the correct answer is **option 3.**

132. The sentence requires a single 'had'.
Hence, the correct answer is **option 2.**

133. The word 'again' is redundant as it is placed after 'to repeat' which means the same.
Hence, the correct answer is **option 3.**

134. This sentence has no error.
Hence, the correct answer is **option 4.**

135. The RS link - 'was like a family's elder….' - is essential which is only seen in option 1.
Hence, the correct answer is **option 1.**

136. R has to be the first sentence as 'A year or so' is the correct phrase.
Q must follow R as it describes Bangkok. S takes this further. The correct order is RQSP.
Hence, the correct answer is **option 2**.

137. Comprises means 'consists of' and is the appropriate word for the blank.
Hence, the correct answer is **option 2.**

138. The blank needs to be filled by a pronoun in the subjective case. 'I' is ruled out. It is appropriate to use "myself" when you have used "I" earlier in the same sentence.
Hence, the correct answer is **option 2.**

139. Isthmus - a narrow strip of land connecting two larger land areas
Archipelago - an expanse of water with many scattered islands
Hinterland - a region lying inland from a coast
Swamp - a wetland often partially or intermittently covered with water
Hence, the correct answer is **option 3.**

140. The tense is present-continuous and must be retained in the passive voice.
Hence, the correct answer is **option 4.**

141. Option 1 misses the pronoun 'it'. Option 2 misses the detail 'about' and distorts what is mentioned in the actual statement. Option 3 mentions 'you', in the passive voice 'by you/him/her' is understood and need not be mentioned.
Hence, the correct answer is **option 4.**

142. Q expands the idea of polymers which is introduced in the statement.
R talks about the variants of polymers. S talks about 'those polymers' having replaced the chromium-plated ones, which is introduced in R.
P gives a fitting conclusion to the paragraph.
Hence, the correct answer is **option 1.**

143. Frugal means characterized by or reflecting economy in the use of resources.
Hence, the correct answer is **option 4.**

144. A harbinger is the one that pioneers in or initiates a major change.
Hence, the correct answer is **option 3.**

145. Exodus – a mass departure
Influx - a coming in
Hence, the correct answer is **option 1.**

146. Equanimity - evenness of mind especially under stress
Excitement – something that rouses
Hence, the correct answer is **option 4.**

147. Dragon - a violent, combative, or very strict person- is the odd man out.
The other words are related to 'issuing commands' or 'giving orders'.
Hence, the correct answer is **option 4.**

148. Shell is "built around" a particular component like a kernal.
In the same way a Pupa is the outer layer of a growing Caterpillar and the Cocoon is the outer layer of the larva.
Syncope is an "umbrella term" and technical word for faint and lassitude means a state or feeling of weariness, diminished energy, or listlessness.
Hence, the correct answer is **option 4.**

149. The tense required here is the present perfect continuous.
Hence, the correct answer is **option 3.**

150. The latter part of the sentence must continue with the word that juxtaposes 'initial', as the word 'although' in the beginning suggests a turn of events in the latter part of the sentence.
Also, the initial part of the sentence states that 'the investigations pointed towards him', the only option that juxtaposes this is option 4.
Hence, the correct answer is **option 4.**