

CSAT – 30 MAY 2022

1.b

1 male out of 5 males can be selected in  ${}^5C_1$  ways

Similarly 1 female out of 3 can be selected in  ${}^3C_1$  ways

Since Ms Abhishek refuses to be in the committee which has Mr Bharath, the possible ways so that a committee can be constituted is  ${}^5C_1 \times {}^3C_1 - 1 = 5 \times 3 - 1 = 14$

2.c

Let the three numbers be X, Y and Z.

Sum of squares of three numbers is 138 and sum of their products taken two at a time is 131

Therefore,  $X^2 + Y^2 + Z^2 = 138$

$XY + YZ + ZX = 131$

Formula:  $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

This formula can be used to easily find the sum of three numbers. Substituting the values, we get

$(X + Y + Z)^2 = X^2 + Y^2 + Z^2 + 2(XY + YZ + ZX)$

$(X + Y + Z)^2 = 138 + 2(131)$

$(X + Y + Z)^2 = 400$

Hence,  $(X + Y + Z) = 20$

3.a

Let the capacity of the tank be LCM of 12 and 15 = 60l

The rate of flow through the inlet pipe 1 =  $60/12 = 5$  l/min

The rate of flow through the inlet pipe 2 =  $60/15 = 4$  l/min

It is given that despite leakage the two inlet pipes together can fill the tank in 20 min.

Let the flow through the leakage be  $x$  l/min

$(5+4-x)20=60$

→  $9 - x = 3$

→  $x = 6$

The leakage will empty the tank in  $60/6 = 10$  min

4.b

3-digit numbers have to be formed using the digits 1 to 9.

Here, the order of the digits matters.

Therefore, there will be as many 3-digit numbers as there are permutations of 9 different digits taken 3 at a time.

Therefore, required number of 3-digit numbers =  ${}^9P_3 = 9!/(9-3)!$

→  $9 \times 8 \times 7 \times 6! / 6! = 504$

5.c

In such case, we first need to find the HCF of 44, 66 and 110

$$\text{HCF} = 22$$

$$\text{Then, the required numbers of rows} = \{(44/22) + (66/22) + (110/22)\} = 10$$

6.c

Let's say that the wrestlers are named a, b, c, d and e, in increasing order of weights. The average of a, b, c and d is 40 kg, whereas the average of b, c, d and e is 45 kg.

The sum of a, b, c and d is 160 kg, and the sum of b, c, d and e is 180 kg.

What is the total weight of all the wrestlers?

There are two ways of looking at this.

a)  $160 + e$

b)  $180 + a$

Or, e is 20 more than a.

The total weight is  $160 + e$ . So, the highest value of e will correspond to the highest possible average. The highest possible value of e occurs when it is 20 higher than the highest possible value for a, which is 40 (all the first 4 scores are equal to 40).

So, the highest possible average is  $(160+60)/5 = 44$

This will be the case when the weights are 40 kg, 40kg, 40 kg, 40 kg and 60 kg.

Conversely, the least possible value for the average occurs when a is the least. This happens when e is the least too (since a is 20 less than e).

The least possible value for e is  $45 = 180/4$

So, the least possible value for a would be 25.

The least possible average =  $(180+25)/5 = 41$

This will be the case when the weights are 25 kg, 45kg, 45 kg, 45 kg and 45 kg. So, the difference between maximum possible and minimum possible average = 3 kg

7.a

$$\text{Ratio of profit} = \text{capital of Sudarma} * \text{time} / \text{capital of Divya} * \text{time}$$

Let Divya's investment be for x months.

$$\text{Then, } 8/3 = (36,000*12) / (27,000*x)$$

On solving  $x = 6$  months

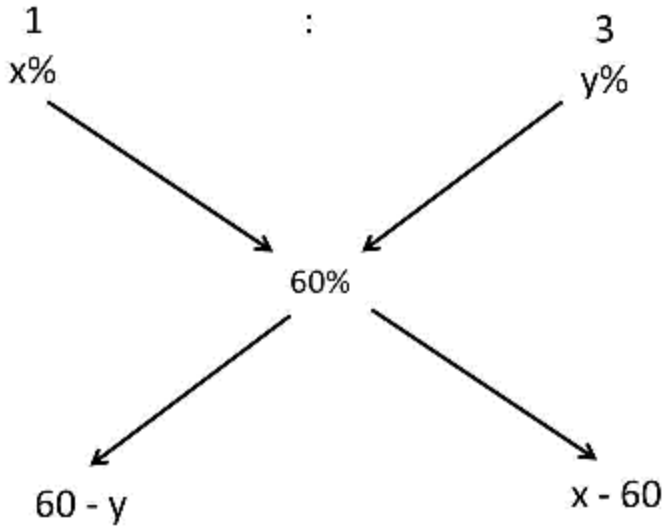
8.d

To start with  $x > y \Rightarrow x > 60 > y$

$$(x - 60) = 3(60 - y).$$

$60 - y$  is an integer  $\Rightarrow x - 60$  has to be a multiple of 3.

x can take values  $\{63, 66, 69, \dots, 99\} \rightarrow$  A total of 13 values.



9.a

Refer to, “Thus, access is the ultimate objective of transportation. As a result, urban planning and design should focus on how to bring people and places together, by creating cities that focus on accessibility, rather than simply increasing the length of urban transport infrastructure or increasing the movement of people or goods.”

Option c is out of context.

Hence, option a is the correct answer.

10.b

Refer to, “the effects of urbanization and climate change are converging in ways which threaten to have unprecedented negative impacts on urban quality of life, and economic and social stability.”

Hence statement 1 is incorrect.

Statement 2 and 3 are correct and mentioned in the 2<sup>nd</sup> and 3<sup>rd</sup> paragraphs of the passage.

Hence, option b is correct.

11.c

Refer to, “It notes that traditional approaches to urban planning (particularly in developing countries) have largely failed to promote equitable, efficient and sustainable human settlements”

And “It concludes that new approaches to planning can only be meaningful, and have a greater chance of succeeding, if they effectively address all of these challenges, are participatory and inclusive, as well as linked to contextual socio-political processes.”

Hence, option c is correct

12.a

Refer to, "On a per capita basis, water availability has been declining — from 1,816 cubic meters in 2001 and 1,546 in 2011 to 1,367 cubic meters in 2021." Hence, statement 1 is incorrect.

Refer to, "The restoration of the water supply often leads to the privileged cornering access to it. "

"However, at the micro level, the multiplicity of the departments that govern water and allied issues is still a huge hurdle to a composite view and sustainable solutions.

Hence, statements 2 and 3 are correct.

13.c

Refer to, "Till then they pose a significant threat to economic growth, security and health of the ecosystem and the victims are likely to be the poorest of the poor as well as the very sources of water - rivers, wetlands and aquifers."

From the last sentence of the 2nd paragraph it is evident that the writer's main objective in writing this passage is to point out the seriousness of the threat posed by unresolved water conflicts.

Option c is hence the correct answer.

14.a

Refer to, "Tracking a student means having the ability to target education towards weaknesses and strengths. The ability to accurately customize to the individual..."

It can be clearly inferred from the above two sentences given in the passage that by the term 'tracking a student' the author meant analysing the performance of a student and designing an educational syllabus accordingly

Hence, option a is the correct answer

15.b

Let the moneylender has Rs 100 initially.

1st year --->  $100 + 50$  (interest) --->  $150 - 20\%$  bribe ---> 120

2nd year --->  $120 + 60$  (interest) --->  $180 - 20\%$  bribe ---> 144

3rd year --->  $144 + 72$  (interest) --->  $216 - 20\%$  bribe ---> 172.8 (This is the capital he will have at the beginning of 4th year)

So, if 172.8 --> 25,000

=> 36 (bribe given in 2nd year) =  $(25000/172.8) * 36$  which on simplifying becomes  $25000/4.8$ . Thus greater than 5000 but less than 6000 so,

Note – Never go for solving the entire calculation in such type of questions. Most of them can be managed using the options. Saves a lot of precious time

16.b

Rate downstream =  $(1/10)*60$  km/hr = 6 km/hr

Rate upstream = 2 km/hr

Speed in still water =  $(6+2)/2 = 4$  km/hr

Therefore required time =  $5/4$  hours =  $1 (1/4)$  hours

17.d

Let average in class Z = a.

Average of class Y =  $a + 16$ .

Average of class X = b

$$b = 2 + (20b + 30(a + 16) + 50a) / 100$$

$$(b - 2) * 10 = 2b + 3a + 48 + 5a$$

$$10b - 20 = 2b + 8a + 48$$

$$8b - 8a = 68$$

$$b - a = 8.5.$$

This is the difference between average of class X and class Z.

18.b

Let the numbers are in the form of  $(10x + y)$ , so when the digits of the number are reversed the number becomes  $(10y + x)$ .

According to question,

$$(10y + x) - (10x + y) = 18;$$

$$9(y - x) = 18; y - x = 2$$

So, the possible pairs of  $(x, y)$  are  $(1, 3), (2, 4), (3, 5), (4, 6), (5, 7), (6, 8)$  and  $(7, 9)$ .

But, we need the number other than  $(1, 3)$

Thus, there are 6 possible numbers i.e. 24, 35, 46, 57, 68, 79.

So, total numbers of possible numbers are 6.

19.a

$$C M J O K = (27 - 3) + (27 - 13) + (27 - 10) + (27 - 15) + (27 - 11) = 24 + 14 + 17 + 12 + 16 = 83$$

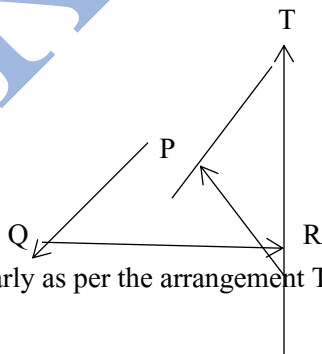
$$Q U S T F = (27 - 17) + (27 - 21) + (27 - 19) + (27 - 20) + (27 - 6) = 10 + 6 + 8 + 7 + 21 = 52$$

Similarly,

$$E I Q S T = (27 - 5) + (27 - 9) + (27 - 17) + (27 - 19) + (27 - 20) = 22 + 18 + 10 + 8 + 7 = 65$$

Therefore, the correct answer is option a

20.c



Clearly as per the arrangement T lies in the north east of P.

21.b

Let the average expenditure of all the nine be Rs X.

Then,  $150 * 8 + (X + 56) = 9X$

Therefore  $X = 157$

Total money spent =  $9X = \text{Rs } (9 * 157) = \text{Rs } 1413$

22.a

From the question it is clear that, Gain is 20%

From 1, it is clear that S.P. - C.P. = 40, so it is sufficient to get answer.

While 2 is not sufficient to get answer.

23.c

From statements 1 and 2 together,

N is placed to the immediate left of W.

Therefore, the arrangement becomes

V M W J \_ \_ Q R

Thus, the question can be answered using both statements I and II together.

24.c

Since, elasticity of Basketball =  $p * q * r * s$ , If we assume initial elasticity to be 100, we can apply successive % changes to arrive at the final figure

$100 - 30\% \rightarrow 70$  (Any of the change can be carried out first, the result would be same)

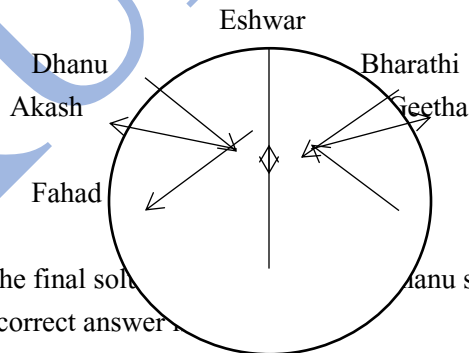
$70 + 30\% \rightarrow 91$

$91 + 25\% \rightarrow 113.75$

$113.75 - 25\% \rightarrow \sim 85.31$

Therefore, percent change in elasticity =  $-14.68\%$

25.c



Following the final solution, Dhanu sits second to the right of Fahad.

Hence, the correct answer is...

26.a

Here, we can see that position of none of the person's position is unchanged if they were made to sit according to their names appear in dictionary in clockwise direction starting from A.

27.c

Let the present age of nephew =  $x$

Then, present age of the Mohnish =  $3x+3$

Given that, three years hence, Mohnish's age will be 10 years more than twice the age of his nephew

$$3x+3+3 = 2(x+3) + 10$$

$$x = 10$$

Therefore, Mohnish's present age =  $3(10)+3 = 33$  years

28.a

Trick: Number is divisible by 9, if sum of all digits is divisible by 9, so  $(2+2+3+\#+4+3+1) = 15+\#$  should be divisible by 9,

$15+3$  will be divisible by 9,

So that least number is 3.

29.b

We can assume  $a, b, c$  and  $d$  are in ascending order (with the caveat that numbers can be equal to each other)

$$a + b + c = 90$$

$$b + c + d = 120$$

We need to find the maximum and minimum value of  $a + b + c + d$ .

$a + b + c + d = 120 + a$ . So, this will be minimum when  $a$  is minimum.

Given  $a + b + c = 90$ .  $a$  is minimum when  $b + c$  is maximum. If  $b + c$  is maximum,  $d$  should be minimum.

Given that  $b + c + d = 120$ , the minimum value  $d$  can take is 40 as  $d$  cannot be less than  $b$  or  $c$ .

The highest value  $b + c$  can take is 80, when  $b = c = d = 40$ . When  $b = c = d = 40$ ,  $a = 10$ .

$$a + b + c + d = 130. \text{ Average} = 32.5$$

Similarly,  $a + b + c + d = 90 + d$ . So, this will be maximum when  $d$  is maximum.

Given  $b + c + d = 120$ .  $d$  is maximum when  $b + c$  is minimum. If  $b + c$  is minimum,  $a$  should be maximum.

Given that  $a + b + c = 90$ , the maximum value  $a$  can take is 30 as  $a$  cannot be greater than  $b$  or  $c$ . The

lowest value  $b + c$  can take is 60, when  $a = b = c = 30$ . When  $a = b = c = 30$ ,  $d = 60$ .

$$a + b + c + d = 150. \text{ Average} = 37.5$$

So, the average has to range from 32.5 to 37.5

30.a

The watch gains 5 seconds in 3 minutes  $\Rightarrow$  1 minute in 36 minutes

From 8 AM to 5:15, the incorrect watch has moved 9 hours and 15 minutes = 555 minutes.

When the incorrect watch moves for 37 minutes, correct watch moves for 36 minutes.

When the incorrect watch moves for 1 minute, correct watch moves for  $36/37$  minutes

When the incorrect watch moves for 555 minutes, correct watch moves for  $(36/37)*555 = 36*15$  minutes = 9 hours

9 hours from 8 AM is 5 PM.

The correct time is 5 PM.

31.d

We are given that 15th March 1816 was a Friday. Now we know that 100 years have 5 odd days. So till 15th March 1916, we will be having 5 odd days. So if we move from 15th March 1816 to 15th March 1916, we will encounter 5 odd days. Now from 15th March 1916 to 15th April 1916 there would be 3 odd days.

So total number of odd days =  $5+3 = 8 \pmod{7} = 1$

So 15th April 1916 would be Friday + 1 = Saturday

32.a

The required number will be such that it leaves a remainder of 1 when divided by 2, 3 or 4 and no remainder when divided by 5. Such a number is 25 among options.

33.c

Politicians feel interested in exploiting religions for serving their political ends because religious sentiments are deeply rooted and are highly emotionally charged even at the personal level.

Hence, option c is the correct answer.

34.d

Refer to, "Russia's political aim is driven both by insecurity due to the likelihood of expansion of NATO (North Atlantic Treaty Organisation) to include Ukraine and by irredentism because it does not consider Ukraine to be an independent nation but a part of Russia's civilisational culture."

Option a is incorrect as it means only plan A has failed

Option b is out of context

Option c is wrong as it is Russia' short term policy not the long term vision.

The answer, therefore, is option d.

35.a

Observe the following lines: "But in its deepest sense education is not instrumentalist. That is to say, it is not to be justified outside of itself..."

Options b, c and d are mentioned in the passage as the outcomes of education.

Hence, the correct answer is option a.

36.a

Refer to the first 2 paragraphs and observe the arguments made. It clearly points out rising cost of raising kids in China while highlighting the declining birth rate.

All the other options are incorrect and out of context.



Hence, the correct answer is option a.

37.d

Refer to, "The study said the cost in cities could be more than double at 6,30,000 yuan (\$99,666) than in rural areas at 3,00,000 yuan (\$47,460)."

"China recorded a population growth of 0.34 per cent per one thousand in 2021, a decrease of 1.11 per cent, which is the country's lowest ever recorded population growth."

Hence, statements 1 and 2 are correct.

Refer to the last 2 lines of the passage which makes statement 3 incorrect.

38.c

Refer to, "One of Russia's greatest strategic weaknesses has recently turned into an advantage. Climate change may tilt the balance further in Moscow's favor."

Hence, option a is incorrect.

Option b and d are out of context.

Refer to the last paragraph which makes it clear that option c is correct.

39.c

The correct answer is option c, Defensive. The passage definitely expresses an opinion, but it seeks to defend an earlier opinion expressed previously. So, it cannot be judgmental. There is no regret that priest hood was established or regret of anything else. Only an opinion is expressed defending a previous one. The purpose of the passage is to defend, not to criticize. There is no personal attack, so it cannot be sarcastic.

40.a

You have to select 2 cards from 5.

Since the order in which they are drawn matters,

There are  $5P_2 = 5!/3! = 20$  elementary events from which there are 4 favourable numbers of cases: 10 before 9, 9 before 8, 8 before 7 and 7 before 6.

Hence, probability =  $4/20 = 1/5$

41.c

Failed in quants,  $n(A) = 44$

Failed in reasoning,  $n(B) = 32$

$n(A \cup B) = n(A) + n(B) - n(A \cap B)$

→  $44 + 32 - 30 = 46$

Failed in either one or both topics are 46

Percentage passed =  $(100 - 46) \% = 54\%$

42.c

Let A = Event that Parrot 1 speaks the truth.

B = Event that Parrot 2 speaks the truth

Then  $P(A) = 75/100 = 3/4$

$P(B) = 80/100 = 4/5$

$P(A\text{-lie}) = 1 - 3/4 = 1/4$

$P(B\text{-lie}) = 1 - 4/5 = 1/5$

Now

Parrot 1 and Parrot 2 contradict each other = [Parrot 1 lies and Parrot 2 true] or [Parrot 1 true and Parrot 2 lies]

=  $P(A) \cdot P(B\text{-lie}) + P(A\text{-lie}) \cdot P(B)$  [Please note that we are adding at the place of OR]

=  $(3/5 \cdot 1/5) + (1/4 \cdot 4/5) = 7/20$

=  $(7/20 \cdot 100) \% = 35\%$

43.b

Let the C.P. be x and S.P. be y.

∴ Given,

$$3(y-x) = 2y - x$$

$$\Rightarrow 3y - 3x = 2y - x$$

$$\Rightarrow y = 2x$$

Original profit = Rs  $y - x$

= Rs  $2x - x$  (Since,  $y = 2x$ )

= Rs x

∴ Original profit % =  $x/x \cdot 100$

= 100 %

44.c

Let's start with taking a random value for all three categories. So let's first take 40 for the all three category.

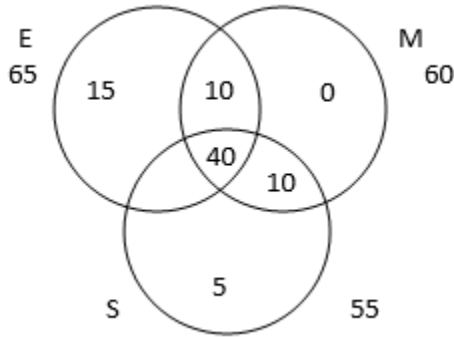
Now  $65 + 60 + 55 = 180$ , this means there is an extra count of  $180 - 80 = 100$ .

Now as we know that the extra count occurs in "the exactly two area" and "the all three area." So let's try putting the extra count in this area.

Trial 1 - Since 40 is already assumed to be in the all three area, it takes care of extra count of  $40 \times 2 = 80$ .

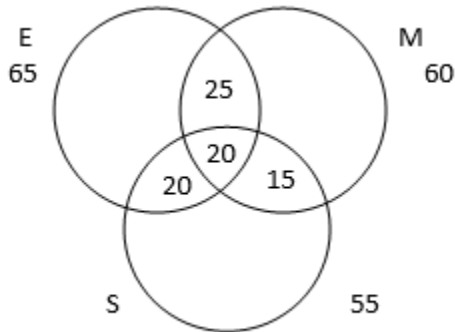
Thus we are left with 20 as extra count which we have to place at the exactly two areas

Thus in the above case our Venn diagram will look as:



A close look in the figure tells us that we can further decrease the value of all the three area. A bit of logical thinking will bring us to the value 20. No value less than 20 can satisfy the conditions of the question. As there is no scope left for reallocating numbers left from one area to another in this case.

Hence, the final Venn diagram will look as:



45.d

Let the third number is  $x$

Then first number =  $(100-30)\%$  of  $x$   
 $= 70\%$  of  $x = 7x/10$

Second number is  $(63x / 100)$

Difference =  $7x/10 - 63x/100 = 7x/100$

So required percentage is, difference is what percent of first number

$\Rightarrow (7x/100 * 10/7x * 100)\% = 10\%$

46.d

At present the total age of the family =  $5 * 20 = 100$ .

The total age of the family at the time of the birth of the youngest member,  
 $= [100 - 10 - (10 * 4)] = 50$

Therefore, average age of the family at the time of birth of the youngest member,  
 $= 50/4 = 12.5$

47.b

Let 'a' be first term and d be the common difference of the A.P.

As we know that  $a_n = a + (n - 1) d \rightarrow 47 = 2 + 9d$

$$\rightarrow d=5$$

$$\rightarrow S_{15} = (15/2)[2*2 + (15-1)5] = 555$$

48.c

John starts after 3 days, thus Pratyush has already covered 60 km by then (travelling at 20km a day)

The distance between Pratyush and John will be increased to  $60 + 5 + 1 = 66$  km in the next two days.

Since John is following an arithmetic progression in the speed daily, the distance between him and Pratyush will keep on decreasing from the 6th day. It will decrease by 3 km on the first day, 7 km on the next day and so on.

Now John will catch up with Pratyush after  $n + 5$  days from the start of Pratyush

Thus

$$66 = (n/2)*(2*3 + (n-1)*4)$$

If we solve for n in the above equation, we will get  $n = 5.5$

Thus John will catch up with Pratyush on the eighth day when he starts running after Pratyush.

49.a

The selling price per floor mat is Rs. x

The price of the floor mats is Rs (x - 150) more than Rs 150

4% rise from Rs 150  $\implies$  Rs 6

For each Rs 6 increase in price over Rs.150, he sells 3 floor mats lesser.

So, the reduction in number of floor mats  $= ((x-150)/6) * 3$

So, in the new price of Rs. x he sells  $100 - ((x-150)/6) * 3$

Or, he sells  $100 - (x-150)/2$

$$= (200-x+150)/2$$

$$= (350-x)/2$$

$$= 175 - x/2$$

50.d

Given that,

Volume of cubes  $= 64 \text{ cm}^3$

$$(\text{Edge})^3 = 64$$

$$\text{Edge} = 4 \text{ cm}$$

If cubes are joined end to end, the dimensions of the resulting cuboid will be 4 cm, 4 cm, 8 cm.

Therefore, the surface area of cuboid  $= 2(lb+bh+hl)$

$$\rightarrow 2(4*4+4*8+4*8)$$

$$\rightarrow 2(16+32+32)$$

Therefore, the surface area of cuboid =  $160 \text{ cm}^2$

51.a

Refer to the first and third paragraph which makes it clear that option a is correct.

Option b is one of the aspects and is not the main idea of the passage and it is also not discussed elaborately

Options c and d are wrong and out of context with the passage.

52.d

The inference that can be drawn is 'advertisers can derive benefit from the information about viewer's perception of quality of programmes'

Option d is hence the correct answer.

53.c

Refer to, "The report adopts a human security perspective which is concerned with the safety and security of people rather than of states"

Hence statement 1 is correct.

Refer to, "It analyses worldwide trends with respect to each of these threats, paying particular attention to their underlying causes and impacts, as well as to the good policies and best practices that have been adopted at the city, national and international levels in order to address these threats."

From this we can say that statement 2 is incorrect.

54.d

Refer to the last paragraph of the passage which makes it clear that option d is correct.

All the other options are incorrect.

55.a

The correct answer is option a, Didactic. It is in the tone of a teacher teaching someone. Only one sentence (the second one) is in a condescending tone, no other. The arguments are not set out separately for analysis.

Only an opinion is expressed authoritatively. It is not humorous.

56.a

Option b can be eliminated because we do not know whether these hospital-acquired infections were because of poor practices of the doctors or because of other factors.

Option c can be eliminated because the option adds further support to Linda's argument, when in fact the objective is to weaken her argument.

Option d can be eliminated because the option again adds support to Linda's argument. Some people wonder about the usage of the words "self-reported", which might imply that the 90% figure may not be accurate.

However, it cannot be assumed that the doctors are lying or that the actual rate is much lower than 90%.

Option a works because it establishes another reason for carelessness among doctors when it comes to hygiene. If doctors believe they do not carry pathogens, they are more likely to be careless about cleansing schedules.

57.a

We need to consider all three digit and all 4-digit numbers.

Three-digit numbers: A B C. 3 can be printed in the 100's place or 10's place or units place.

=> 100's place: 3 B C. B can take values 0 to 9, C can take values 0 to 9. So, 3 gets printed in the 100's place 100 times

=> 10's place: A 3 C. A can take values 1 to 9, C can take values 0 to 9. So, 3 gets printed in the 10's place 90 times

=> Unit's place: A B 3. A can take values 1 to 9, B can take values 0 to 9. So, 3 gets printed in the unit's place 90 times

So, 3 gets printed 280 times in 3-digit numbers

Four-digit numbers: A B C D. 3 can be printed in the 1000's place, 100's place or 10's place or units place.

=> 1000's place: 3 B C D. B can take values 0 to 9, C can take values 0 to 9, D can take values 0 to 9. So, 3 gets printed in the 1000's place 1000 times.

=> 100's place: A 3 C D. A can take values 1 to 9, C & D can take values 0 to 9. So, 3 gets printed in the 100's place 900 times.

=> 10's place: A B 3 D. A can take values 1 to 9, B & D can take values 0 to 9. So, 3 gets printed in the 10's place 900 times.

=> Unit's place: A B C 3. A can take values 1 to 9, B & C can take values 0 to 9. So, 3 gets printed in the unit's place 900 times.

3 gets printed 3700 times in 4-digit numbers.

So, totally 3 gets printed  $3700 + 280 = 3980$  times.

58.c

Let track length be equal to 't'. When Usain Bolt completes a lap, let us assume Justin Gatlin has run a distance of (t - d). At this time, Carl Lewis should have run a distance of (t - 2d).

After 3 laps Carl Lewis is in the same position as Justin Gatlin was at the end of one lap. So, the position after  $3t - 6d$  should be the same as  $t - d$ . Or, Carl Lewis should be at a distance of d from the end of the lap.

Carl Lewis will have completed less than 3 laps (as he is slower than Usain Bolt), so he could have travelled a distance of either  $t - d$  or  $2t - d$ .

$$\Rightarrow 3t - 6d = t - d$$

$$\Rightarrow 2t = 5d$$

$$\Rightarrow d = 0.4t$$

The distances covered by Usain Bolt, Justin Gatlin and Carl Lewis when Usain Bolt completes a lap will be t, 0.6t and 0.2t respectively. Or, the ratio of their speeds is 5 : 3 : 1.

In the second scenario,  $3t - 6d = 2t - d \Rightarrow t = 5d \Rightarrow d = 0.2t$ .

The distances covered by Usain Bolt, Justin Gatlin and Carl Lewis when Usain Bolt completes a lap will be  $t$ ,  $0.8t$  and  $0.6t$  respectively. Or, the ratio of their speeds is  $5 : 4 : 3$ .

59.d

Here,  $S = \{1, 2, 3, 4, \dots, 19, 20\}$ .

Let  $E =$  event of getting a multiple of 3 or 5 =  $\{3, 6, 9, 12, 15, 18, 5, 10, 20\}$ .

Therefore,  $P(E) = n(E)/n(S) = 9/20$

60.c

Let the Riya's age be  $x$  and Ramesh's age be  $4x$ .

So as per question,  $4x + 5 = 3(x + 5)$

So,  $x = 10$ .

Hence, present age of Riya is 10 years and present age of Ramesh is 40 years.

So, after  $5 + 5 = 10$  years, Riya's age would be 20 years and Ramesh's age would be 50 years.

Hence, Ramesh would be  $50/20 = 2.5$  times of Riya's age.

61.d

Since Bhavya and Dhanya are twins, so  $Bhavya = Dhanya$ .

Now,  $Arjun = Bhavya + 5$  and  $Arjun = Charan - 7$ .

Thus,  $Bhavya + 5 = Charan - 7 \Leftrightarrow Dhanya + 5 = Charan - 7 \Leftrightarrow Charan - Dhanya = 12$

62.a

Given that the sum of squares of two numbers is 97 i.e.  $a^2 + b^2 = 97$

From the given options we have to find which one cannot be their product i.e.  $ab$

A.  $64 \Rightarrow 2ab = 128$

B.  $-32 \Rightarrow 2ab = -64$

C.  $16 \Rightarrow 2ab = 32$

D.  $48 \Rightarrow 2ab = 96$

$2ab$  is found because we know that

$$a^2 + b^2 + 2ab \geq 0$$

$$a^2 + b^2 - 2ab \geq 0$$

By this we can know that  $97 + 128$  works but  $97 - 128$  doesn't work so we can understand option A cannot be the product and the rest can be.

$$a^2 + b^2 \geq |2ab|$$

$$a^2 + b^2 \geq 2ab$$

$$a^2 + b^2 \geq -2ab$$

$$\Rightarrow a^2 + b^2/2 \geq |ab|$$

So, here  $2ab$  should lie between  $+97$  and  $-97$  or  $ab$  should be less than  $97/2$  or greater than  $-97/2$ , so except option a, all the other options works so 64 cannot be the product.

63.d

Given that a cocktail contains a mixture of 175 ml water and 700 ml alcohol.

It is given that 10% of the mixture is removed and it is substituted by water of the same amount and the process is repeated once again

Now we have to find the percentage of water in the mixture.

Since the mixture is removed and substituted with water, we can deal with alcohol and the second step we can find how much amount of alcohol is retained and not about how much amount of alcohol is removed

As 10% of alcohol is removed, 90% of alcohol is retained

So alcohol remaining =  $700 \times 90\% \times 90\%$

$$\Rightarrow 700 \times 0.9 \times 0.9 = 567$$

We totally have 875 ml overall mixture and of this 567 ml is alcohol.

Remaining  $875 - 567 = 308$  is the amount of water.

We have to find the percentage of water in the mixture i.e.  $308/875$

Approximately 308 is 30% of 1000 so by this we know that 308 is more than 30%

Hence, 35.2% is the percentage of water in the given mixture.

64.c

Karun ate half Roti on Monday. On Tuesday, he would have eaten half of the remaining Roti i.e.  $1/4$  of the original Roti. Similarly, he would have eaten  $1/8$  of the original Roti on Wednesday and so on for the seven days.

Total Roti Karun ate during the week is

$$= 1/2 + 1/4 + 1/8 + 1/16 + 1/32 + 1/64 + 1/128$$

$$= 127/128$$

$$= 99.22\% \text{ of the original Roti}$$

65.b

Let the total pages were 'n'

$$\text{Hence } 1 + 2 + 3 + 4 + \dots + n = 1053$$

$$\Rightarrow n(n+1)/2 = 1053$$

$$\Rightarrow n(n+1) = 2106.$$

As  $n^2 \approx 2106$  (To simplify calculations, we have taken n and n+1 as equal)

Now, perfect square closest to 2106 is 2116, which is the square of 46.

Here, one page was added twice. It means that 1053 is greater than the actual sum; therefore, 2106 is also greater than the actual value.

So, we will not take  $n = 46$ , as it will further increase the sum.

So, it has to be a number, which appears immediately before 46 i.e. 45.



Hence, we can conclude that 45 pages were added. Now, the sum of 45 pages will be

$$1 + 2 + 3 + \dots + 45 = 45 \cdot 46 / 2 = 1035$$

Since the given sum is 1053, so the page number added twice was  $1053 - 1035 = 18$ .

66.b

Let the fraction be  $x/y$ .

According to the given information,

$$\rightarrow (x-1)/y = 1/3 \implies 3x - y = 3 \rightarrow (1)$$

$$\rightarrow x/(y+8) = 1/4 \implies 4x - y = 8 \rightarrow (2)$$

Subtracting equation (1) from equation (2), we obtain  $x = 5 \rightarrow (3)$

Putting this value in equation (1), we obtain  $15 - y = 3$

$$\implies y = 12$$

Hence, the fraction is  $5/12$

67.b

The statement talks of number of cases of food poisoning due to consumption of liquor and not of the number of cases consuming liquor. So, 1 is not implicit. Besides, the statement indicates that people in rural areas are getting spurious or low-grade liquor and no check is being kept on shops selling liquor there. So, 2 is implicit.

68.b

The statement talks about the safety and health practices in Indian companies being far below international standards. It is clearly a criticism of Indian organizations not paying considerable attention to these aspects. So 2 is implicit. The international standards demand perfection and are in no way non-achievable. So 1 is not implicit.

69.c

The true statement is 'Reasons for model approach by advanced countries are not given in the passage'.

70.b

Statement 1 is incorrect as the proportions of women who are thin are more in rural areas than in urban India

Statement 2 is incorrect as the reduction in marriage of girls below 18 age seems to have only marginal impact on the issue of early teenage pregnancies

Statement 3 is wrong because as per NFHS-5 data every third child is stunted and every fifth child is wasted.

71.c

“Nothing could be farther from the truth. From as early as the 15th century, well before Europeans were even aware of direct sea routes to India, we have evidence that the battlefields and forts of the subcontinent resounded with the boom of gunpowder that Indian rulers proactively hired specialists”....

This excerpt from the passage makes it clear that option c is correct.

72.a

Refer to the first paragraph of the passage, which makes it clear that option a is correct

73.c

The word squeamish means dainty, overnice, fastidious etc.

74.c

Refer to, "There are good reasons why the 'Heart of Asia' conference, part of a 14-nation process begun in 2011 to facilitate the development and security of Afghanistan, is so named. The Heart of Asia process thus remains critical to forging cooperation to realise Afghanistan's potential to be a vibrant Asian "hub"."

Hence, option c is correct.

75.a

For a number to be a multiple of 15, it has to be a multiple of 3 and of 5. So, the last digit has to be 5 and the sum of digits should be a multiple of 3.

We can have either 4-digit or 5-digit numbers. If we have a 4-digit number, sum of the digits will be  $1 + 2 + 3 + 5 = 11$ .

No 4-digit number formed with digits 1, 2, 3, 5 exactly once can be a multiple of 3. So, there is no possible 4-digit number.

Now, in any 5 digit number, we will have 1, 2, 3, 5 once and one of these 4 digits repeating once.  $1 + 2 + 3 + 5 = 11$ . So, the digit that repeats in order for the number to be a multiple of 3 has to be 1. In this instance, sum of the digits will be 12 and this is the only possibility.

So, any 5-digit number has to have the digits 1, 1, 2, 3, 5. For the number to be a multiple of 5, it has to end in 5.

So, number should be of the form \_\_\_\_\_ 5, with the first 4 slots taken up by 1, 1, 2, 3. These can be rearranged in  $4!/2! = 12$  ways.

There are 12 possibilities overall.

76.c

Interest for Rs. 15,000 for first month =  $(15,000/1000)a = 15a$

Interest for Rs. 15,000 for next two months =  $2 \times (15,000/1000)b = 30b$

Total interest for first 3 months =  $15a+30b$

77.b

a, b, c and d are in A.P.

Dividing throughout this A.P. by abcd, we get

$a/abcd$  ,  $b/abcd$  ,  $c/abcd$  ,  $d/abcd$  are in A.P.

$1/bcd$  ,  $1/acd$  ,  $1/abd$  ,  $1/abc$  are in A.P.

$\Rightarrow bcd$ ,  $acd$ ,  $abd$  and  $abc$  are in H.P.

78.a

Arun: Bheem: Charan =  $(10 * 7) : (12 * 5) : (15 * 3) = 70 : 60 : 45 = 14 : 12 : 9$ .

Charan's rent = Rs  $(175 * 9/35) = \text{Rs } 45$

79.c

Suppose, first pipe alone takes X hours to fill the tank.

Then, second and third pipes will take  $(X - 5)$  and  $(X - 9)$  hours respectively to fill the tank.

Therefore,  $(1/X) + (1/X-5) = 1/(X-9)$

$(X-5) + X/[X(X+5)] = 1/(X-9)$

$X^2 - 18X - 45 = 0$

$(X-15)(X+3) = 0$

$X = 15$  (NEGLECTING 3)

80.d

Column One:  $(10 + 12 + 4 + 14) / 2 = 20$  [i.e. the sum of first 4 numbers in the column gives the fifth number]

Column Two:  $(11 + 12 + 5 + 24) / 2 = 22$

In the same way column four:  $(2 + 8 + 9 + 5) / 2 = 12$