

## ANSWERS & EXPLANATION

### APTITUDE TEST–Test (4300) – 2024

1 (a)

Required unit digit = Unit digit of  $(7)^{635} \times (3)^{986}$

$(7)^{635}$  produces unit digit of 3 (as  $7 \times 7 \times 7 = 343$ )

$(3)^{986}$  produces unit digit of 9 (as  $3 \times 3 = 9$ )

So, the unit digit of  $(587967)^{958635} \times (5863)^{986}$  = unit digit of  $(3 \times 9)$  = unit digit of  $27 = 7$

Thus, the unit digit of  $(587967)^{958635} \times (5863)^{986}$  is an odd number.

Hence, option (a) is the right answer.

2 (a)

**Assumption 1 is correct** as the passage states that countries have adopted laws to 'protect' them. This assumes that they may need protection against retaliation. Also, the passage notes that whistleblowing systems are known as 'speak up' mechanisms. This assumes that whistle-blowers may be hesitant in pointing out the wrong doings. **Hence, this assumption is correct.**

**Assumption 2 is incorrect.** The passage talks about whistle blowers in general. It does not specifically talk about their position or rank in an organisation. **Hence, this assumption is incorrect.**

3 (c)

**Option (a) is incorrect** because the passage does not touch upon the aims and motivations of whistle-blowers themselves, but on the benefits they bring and the protection they need. **Hence, this is not the best crux of the passage.**

**Option (b) is incorrect** because the passage highlights the laws that protect whistle-blowers – "An increasing number of countries now acknowledge the important role of whistle-blowers and have adopted laws to protect them, by requiring organisations to implement internal whistleblowing systems – also known as "speak up" or internal reporting mechanisms." However, the passage does not analyse the effectiveness of the laws protecting whistle-blowers. **Hence, this is not the best crux of the passage.**

**Option (c) is correct** because the passage states that whistle-blowers benefit multiple stakeholders such as the public, companies, and institutions as stated in the lines - "Whistle-blowers have a key role in protecting the **public, companies and institutions** from undetected corruption, mismanagement and other misconduct, and their damaging consequences. **They enable early detection of wrongdoing, allowing organisations** to act before a situation causes harm to the public, triggers liability or leads to serious financial losses." This is the essence of the passage as it explains the importance of whistleblowing and the reason why it must be protected. **Hence, this is the best crux of the passage.**

**Option (d) is incorrect.** The passage mentions that many countries have laws that require organisations to have internal whistleblowing mechanisms. It does not distinguish these organisations as private or public. Therefore, this answer option is beyond the scope of the passage. **Hence, this is not the best crux of the passage.**

4 (a)

**Option (a) is correct** because the passage states that the trend of deglobalization being accelerated will frustrate global responses to climate change. It is evident from the lines *"Deglobalization is being accelerated through a combination of old-fashioned protectionism, new-fangled 'friend-shoring' (limiting trade to countries with shared values), and geo-strategically motivated bans and sanctions..."* These lines clearly highlight the hurdles presented by deglobalisation in addressing climate change. **Hence, option (a) is correct.**

**Option (b) is incorrect** because while the passage lays out a causative sequence across mitigation, adaptation, and migration, it does not advocate prioritising mitigation over adaptation and migration. Also, the main theme is how deglobalization will impact climate change goals and could eventually cause migration; this answer option leaves this context of the passage. **Hence, option (b) is incorrect.**

**Option (c) is incorrect** because while the passage notes the trend of "friend-shoring" based on shared values, this is only one component of accelerating deglobalization and, hence, cannot be considered to best reflect the critical message. **Hence, option (c) is incorrect.**

**Option (d) is incorrect** because the passage does not claim migration to be the most immediate consequence of deglobalization. The passage only mentions deglobalization will impact climate change, and migration (leading to climate refugees) is the last event which happens if mitigation and adaptation are not focused upon. **Hence, option (d) is incorrect.**

5 (d)

If the product of two real numbers is a rational number, such that one of them is a rational number, the other may be rational if the first is non-zero. But if the first number is zero, the second number may be irrational also. Hence, we cannot say anything about the second number. [Note: Zero is a rational number.]

For example,  $(1/4) \times 2 = 1/2$

$0 \times \sqrt{2} = 0$

Hence, option (d) is the right answer.

6 (a)

Since, the number of boxes needed should be minimum; the number of toys in each box must be maximum.

So, the number of boxes needed would be the highest common factor of 144, 198 and 252.

$$144 = 2^4 \times 3^2$$

$$198 = 2^1 \times 3^2 \times 11^1$$

$$252 = 2^2 \times 3^2 \times 7^1$$

$$\text{Highest common factor} = 2^1 \times 3^2 = 18$$

$$\therefore \text{The number of boxes needed} = (144 + 198 + 252)/18 = 8 + 11 + 14 = 33$$

Hence, option (a) is the right answer.

7 (c)

$$\text{Number of students that passed} = 52 - 15 = 37$$

In the list of passed students, position of Ramesh is 22<sup>nd</sup> from the top.

$$\text{So, his position from the bottom} = (37 + 1) - 22 = 38 - 22 = 16^{\text{th}}$$

Hence, option (c) is the right answer.

8 (c)

$$\text{Cost price of one-third of goods} = (1/3)(120) = \text{Rs. } 40$$

$$\text{Cost price of two-third of goods} = (2/3)(120) = \text{Rs. } 80$$

$$\text{Selling price of these goods at 5\% loss (means sold at 95\% of Cost price)} = 40 \times (0.95) = \text{Rs. } 38$$

Let selling price of the rest of goods be x.

$$5\% \text{ profit on Rs. } 120 \text{ means S.P.} = (120 \times 105/100) = \text{Rs. } 126.$$

According to the question,

$$126 = x + 38$$

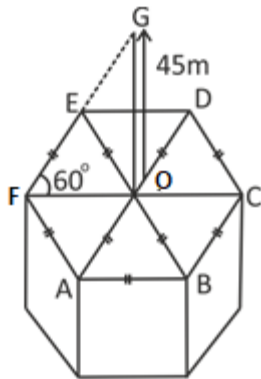
$$\text{Or } x = \text{Rs. } 88$$

As cost price of the remaining goods is Rs. 80, required profit percent =  $\frac{[(SP - CP)/CP] \times 100}{1} = \frac{[(88 - 80)/80] \times 100}{1} = 10\%$

Hence, option (c) is the right answer.

9 (b)

Given:



Length of tower (GO) = 45 meter

In  $\triangle FOG$ ,

$$\tan 60^\circ = \frac{GO}{FO}$$

$$\text{or } \sqrt{3} = \frac{GO}{FO}$$

$$\text{or } \sqrt{3} = \frac{45}{FO}$$

$$\text{or } FO = \frac{45}{\sqrt{3}} = 15\sqrt{3} \text{ meters}$$

Here,  $\triangle OFE$  is an equilateral triangle,

Hence, each side of the hexagon building is  $15\sqrt{3}$  meters.

Hence, option (b) is the right answer.

10 (a)

The given sequence is a combination of two series which is given below:

(I) B, F, H, L, ?

(II) W, S, Q, M, ?

The pattern in (I) is:

$$B \xrightarrow{+4} F \xrightarrow{+2} H \xrightarrow{+4} L \xrightarrow{+2} N$$

The pattern in (II) is:

$$W \xrightarrow{-4} S \xrightarrow{-2} Q \xrightarrow{-4} M \xrightarrow{-2} K$$

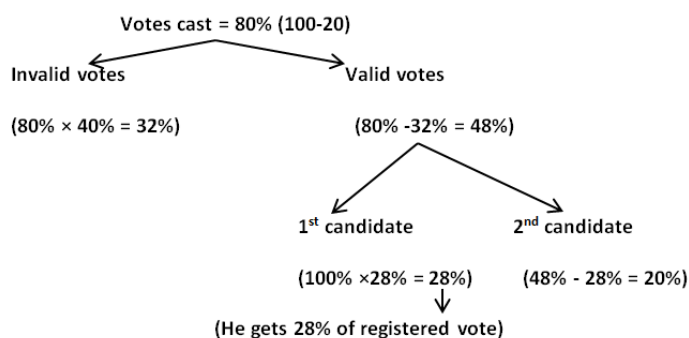
So, the missing two terms in the series is N, K.

Hence, option (a) is the right answer.

11 (a)

Let Registered votes = 100%

Votes that were not cast = 20%



2<sup>nd</sup> candidate lost by 48000 votes. That means 8% is responsible for 48000 votes.

$$\therefore 8\% = 48000$$

$$\therefore 1\% = 48000/8 = 6000$$

$$\therefore \text{Valid votes} = 48 \times 6000 = 288000$$

Hence, option (a) is the right answer.

12 (c)

**Option (a) is incorrect** because the passage states that food security depends on multiple factors, not just on income. Any barrier to access to food can hamper food security. So, even better off people may become food insecure due to calamity or disaster. The lines, "...the worst affected groups **are landless or land-poor households in rural areas, people employed in ill-paid occupations and casual labourers engaged in seasonal activities in the urban areas**", clearly reflect that poor people are the worst affected, but that does not mean that the middle class people are not affected at all. **Hence, the option is not correct.**

**Option (b) is incorrect** because while self-reliance will help with food production, it does not ensure food security as the latter has several components according to the passage ('capacity to buy', 'acceptable quality', and 'no barrier to access'). The passage does not discuss the context of self-reliance and its relationship with food security. **Hence, the option is not correct.**

**Option (c) is correct** because the passage states that in rural areas, the worst affected groups are those who are landless or land-poor. And, since land is an asset, the correlation with food insecurity follows logically as per the lines "... the **worst affected groups are landless or land-poor households in rural area** ..." **Hence, this option is correct.**

**Option (d) is incorrect** because while the passage notes that casual labourers engaged in seasonal activities and those employed in ill-paid occupations in urban areas are worst affected, it does not follow that white-collar workers do not face food insecurity in urban areas. Also, the passage does not specifically mention any section of the society which does not face food insecurity. The author only talks about the worst affected people. **Hence, this option is not correct.**

13 (a)

**Inference 1 is correct.** Social capital refers to the networks of relationships among individuals and groups within a particular society or community, which enable that society to function effectively. The passage states that mental health enables people to 'form meaningful relationships and contribute to their communities.' Therefore, it follows that its promotion and protection will foster social capital. **Hence, this inference is correct.**

**Inference 2 is incorrect** as the passage only mentions that physical health and mental health have inseparable links as seen in the lines "**Physical, psychological, social, cultural, spiritual and other interrelated factors contribute to mental health, and there are inseparable links between mental and physical health**", not that one encompasses (contains or includes within itself) and encapsulates the other. **Hence, this inference is incorrect.**

14 (b)

**Option (a) is incorrect** because the passage does not suggest the role of check-ups even as it underscores the critical importance of mental health for everyone and everywhere. Furthermore, making it universally mandatory is an extreme proposition. **Hence, this option is incorrect.**

**Option (b) is correct** because the passage states that a sound mental health enables people to show resilience in the face of adversity as seen in the lines "*It is integral to well-being, enabling people to realise their full potential, show resilience amidst adversity, be productive across the various settings of daily life, form meaningful relationships and contribute to their communities.*" This implies that its promotion would help one in responding to a crisis (which is an adversity). **Hence, this option is correct.**

**Option (c) is incorrect.** The passage states that spiritual factors contribute to mental health. But, based on the information given in the passage we cannot equate spirituality with religiosity alone. Also, there is no information to establish a direct correspondence between mental health and religious devotion of an individual. **Hence, this option is incorrect.**

**Option (d) is incorrect** because the passage does not touch upon social media or technology. **Hence, this option is completely beyond the scope of the passage.**

15 (d)

**Inference 1 is incorrect** as lightning is mentioned in the passage as a cause of ignition of fires, not as the primary cause of forest fires in tropical rainforests. The forests are made vulnerable to fire by climate change, forest degradation etc. Lightning may ignite these already vulnerable forests. **Hence, saying that lightning is the primary cause of fires would not be correct.**

**Inference 2 is incorrect** as the passage does not mention the age of forests vis-à-vis their susceptibility to fire. It does mention that forests degraded by disease are more susceptible to fire, but it is not logical to infer from it that disease correlates with natural ageing (based only on information contained in the passage). The disease could be caused by external pathogens also. **Hence, inference 2 is not correct.**

16 (b)

Let Ram, Mohan and Rahul get Rs.  $x$ ,  $y$  and  $z$  respectively.  
Ram gets Rs. 76 less than Mohan and Mohan gets Rs. 34 less than Rahul.  
 $x = y - 76$   
So,  $y = x + 76$   
And  $y = z - 34$   
So,  $z = y + 34$   
Or  $z = (x + 76) + 34$  (since,  $y = x + 76$ )  
Or  $z = x + 110$   
Now,  $x + y + z = 1503$   
Or  $x + (x + 76) + (x + 110) = 1503$   
Or  $3x + 186 = 1503$   
Or  $3x = 1503 - 186$   
Or  $3x = 1317$   
Or  $x = 439$   
Hence, option (b) is the right answer.

17 (b)

Speed of Manoj = 4.5 km/hr  
Time taken by Manoj to cover 27 km with 4.5 km/hr speed =  $27/4.5 = 6$  hours  
When Manoj has covered 27 km, Nitin doubles his speed and 6 hours later he overtakes Manoj.  
Let original speed of Nitin be  $v$  km/hr and new speed be  $2v$  km/hr.  
According to the question,  
 $6v + 6 \times 2v = 4.5(12)$   
Or  $18v = 54$

Or  $v = 3 \text{ km/hr}$

Thus, Nitin's original speed was  $3 \text{ km/hr}$ .

Hence, option (b) is the right answer.

**18 (b)**

The pipe can completely fill the tank in 12 hours.

Part of the tank filled in 1 hour =  $1/12$

Part of the tank that can get emptied in 1 hour by the leak =  $1/24$

The extent to which the tank is filled in 4 hours (i.e. from 6:00 a.m. to 10:00 a.m.) =  $(4/12) - (4/24) = 1/6$

Part that need to be filled =  $1 - 1/6 = 5/6$

$5/6$ th the tank would get filled in  $\{(5/6) \times 12\} = 10$  hours

Therefore, the tank will get filled at 10:00 a.m. + 10 hours = 8:00 p.m.

Hence, option (b) is the right answer.

**19 (b)**

Length of circular track = 3600 meters

Speed of Pramod (p) =  $18 \times (5/18) = 5 \text{ m/s}$

Speed of Kumar (k) =  $27 \times (5/18) = 7.5 \text{ m/s}$

Speed of Sanjay (s) =  $36 \times (5/18) = 10 \text{ m/s}$

Time taken by Pramod to complete 1 round of circular track =  $3600/5 = 720$  seconds

Time taken by Kumar to complete 1 round of circular track =  $3600/7.5 = 480$  seconds

Time taken by Sanjay to complete 1 round of circular track =  $3600/10 = 360$  seconds

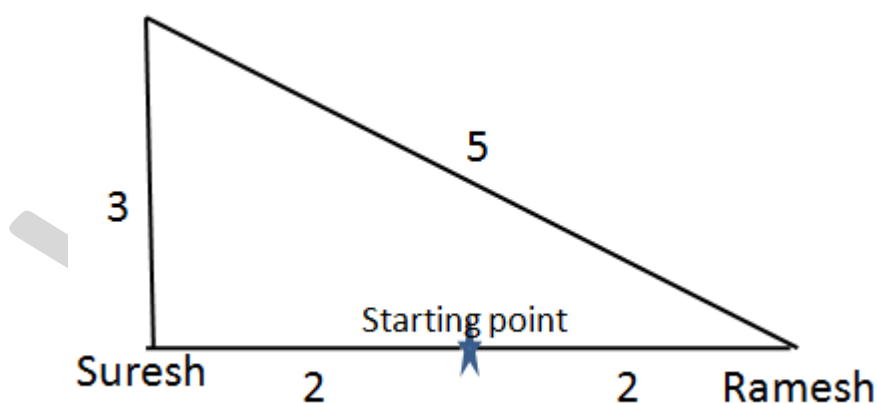
They will meet for the first time at the starting point after a time interval which is the L.C.M of 720 seconds, 480 seconds and 360 seconds.

L.C.M of 720 seconds, 480 seconds and 360 seconds is 1440 seconds.

Hence, they meet at the starting point for the first time after 1440 seconds, i.e. 24 minutes after they started.

Hence, option (b) is the right answer.

**20 (b)**



Distance covered by Ramesh in 1 hour = 5 km.

Time = 1 hr.

So, speed =  $5 \text{ km/hr}$ .

Hence, option (b) is the right answer.

**21 (b)**

Number of cubes (n) = side of big cube / side of small cube =  $34.3/4.9 = 7$

Then, the number of only one side coloured cubes =  $6(n - 2)^2 = 6(7 - 2)^2 = 6(5)^2 = 150$

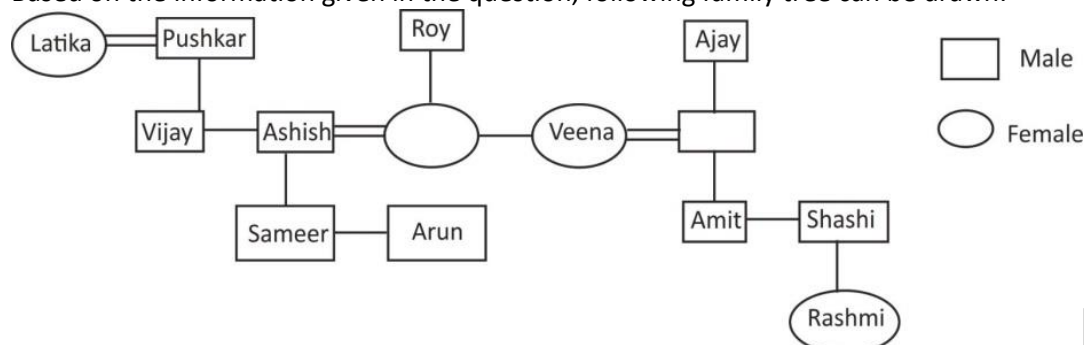
And, the number of non-coloured cubes =  $(n - 2)^3 = (7 - 2)^3 = (5)^3 = 125$

Required difference =  $150 - 125 = 25$

Hence, option (b) is the right answer.

22 (a)

Based on the information given in the question, following family tree can be drawn:



From the above chart, it is clear that the eldest daughter of Roy is the maternal aunt of Shashi. Hence, option (a) is the right answer.

23 (c)

Total of 50 roll numbers =  $50 \times 38 = 1900$

Total of 48 roll numbers =  $37.5 \times 48 = 1800$

Sum of the roll numbers of the students who have been sent out =  $1900 - 1800 = 100$ .

Hence, option (c) is the right answer.

24 (a)

Lalit is taller than Manju but shorter than Mitalee

Mitalee > Lalit > Manju (1)

Vinay is taller than Rajat

Vinay > Rajat (2)

Manju is taller than Vinay.

Manju > Vinay (3)

Combining (1) and (3), we get:

Mitalee > Lalit > Manju > Vinay (4)

Combining (2) and (4), we get:

Mitalee > Lalit > Manju > Vinay > Rajat

Clearly, Rajat is the shortest.

Hence, option (a) is the right answer.

25 (d)

**Statement 1 is incorrect** as the passage does not explicitly state that India's rapid GDP growth has or has not been primarily environmentally conscious and sustainable. It mentions the need for such growth "... where the **pursuit of rapid GDP growth needed to be environmentally conscious and sustainable** to lift living standards ..." but does not make a direct claim about the sustainable and environmentally friendly nature of the growth so far. The emphasis is on shaping the future course of growth, rather than analysing the past nature of growth. **Hence, this statement is incorrect.**

**Statement 2 is incorrect.** The passage notes in the Indian context "... where the **pursuit of rapid GDP growth needed to be environmentally conscious and sustainable** to lift living standards ..." This means that economic growth and environment conservation efforts should be done simultaneously from the beginning, and not after a country has already become developed. **Hence, this statement is incorrect.**



26 (b)

**Statement 1 is incorrect** because the demographic shift is mentioned as a cause behind the increase in the incidence of cancer, and not as an impact of the disease on the emotional health of the patient. **Hence, this statement is incorrect.**

**Statement 2 is correct** because the passage mentions that stigma associated with cancer leads to discrimination as given in the lines "*Cancer also has an associated stigma that can lead to isolation and discrimination, severely impacting the mental health and well-being of patients,*" and this impacts the emotional health of patients. **Hence, this statement is correct.**

**Statement 3 is correct** as indicated in the lines: "*The psychological toll of cancer extends to caregivers and families, disrupting family dynamics and often leading to a diminished quality of life.*" These disruptions are bound to add to the emotional burden. **Hence, this statement is correct.**

27 (a)

**Option (a) is correct** because the passage notes that the financial burden of healthcare leads to challenges that cause "...ripple effects through the economy...", affecting development and social welfare. It then notes that "*For those suffering from cancer, the financial cost is even higher.*" Hence, it can be inferred that cancer would affect the wider social and economic welfare of the country.

**Option (b) is incorrect** because the passage mentions that the '*emotional burden of the disease is often overlooked but is equally debilitating.*' There is a clear indication towards factoring in the emotional burden also. Therefore, it would be incorrect to say that managing emotional burden should not be a priority for the healthcare system.

**Option (c) is incorrect** because while the passage notes demographic ageing as a reason for the increase in the incidence of cancer, it does not claim the necessity of its reversal for the prevalence of cancer to reduce. It is clear from the lines: "*The demographic shifts towards an ageing population and changes in lifestyles are contributing to an increase in the prevalence of cancer...*" It is possible that cancer cases reduce by undoing the harmful changes in lifestyle. **Hence, this inference is not correct.**

**Option (d) is incorrect.** The passage states that there is an '*increase in the prevalence of cancer.*' The last line of the passage talks about ageing and lifestyle changes as the probable reasons. There is no indication towards improvements in detection mechanisms. **Hence, this inference is not correct.**

28 (b)

Given equation:  $12 + 15 \div 18 \times 19 - 2 = 27$

On interchanging + and  $\times$ , we get the equation:

$$\text{L.H.S.} = 12 \times 15 \div 18 + 19 - 2$$

$$\text{L.H.S.} = 12 \times (15/18) + 19 - 2$$

$$\text{L.H.S.} = 12 \times (5/6) + 19 - 2$$

$$\text{L.H.S.} = 10 + 19 - 2$$

$$\text{L.H.S.} = 29 - 2$$

$$\text{L.H.S.} = 27$$

$$\text{Thus, L.H.S.} = \text{R.H.S.} = 27$$

Hence, option (b) is the right answer.

29 (a)

The given number is the square of the sum of the other two numbers

$$(3 + 7)^2 = 100$$

$$(3 + 10)^2 = 169$$

$$(5 + 12)^2 = 289$$

Hence, option (a) is the right answer.



30 (d)

The middle letter remains unaltered in the code. Let us label the five letters before the middle letter as well as those after it, from 1 to 5. Then the code contains the letters of each group in the order 5, 4, 3, 2, 1.

'PROBA B I L I T Y' → 'A B O R P B Y T I L I'  
1 2 3 4 5 B 1 2 3 4 5                      5 4 3 2 1 B 5 4 3 2 1

Similarly,

'GERMI N A T I O N' → I M R E G N N O I T A  
1 2 3 4 5 N 1 2 3 4 5                      5 4 3 2 1 N 5 4 3 2 1

Hence, option (d) is the right answer.

31 (c)

A: Animesh will get job in DRDO.

B: Animesh will get job in ISRO.

Probability that Animesh will get job in DRDO =  $P(A) = 2/3$

Probability that Animesh will get job in ISRO =  $P(B) = 1 - 5/9 = 4/9$

Probability of getting at least one job =  $P(A \cup B) = 4/5$

We know,  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Or  $4/5 = (2/3) + (4/9) - P(A \cap B)$

Or  $P(A \cap B) = (2/3) + (4/9) - (4/5)$

Or  $P(A \cap B) = (30 + 20 - 36)/45$

Or  $P(A \cap B) = 14/45$

Thus, the probability that he will get both jobs is  $14/45$ .

Hence, option (c) is the right answer.

32 (a)

In the first row:

$12 \times 5 = 60$ ;  $60 + 35 = 95$

In the third row:

$14 \times 5 = 70$ ;  $70 + 35 = 105$

Similarly, in the second row:

$13 \times 5 = 65$ ;  $65 + 35 = 100$

Hence, 65 is the missing term.

So, option (a) is the right answer.

33 (d)

People buying milk P in city C = 15 lakh

People buying milk P in city D = 5 lakh

People buying milk P from city C and D together =  $15 + 5 = 20$  lakh

People buying milk Q in city B = 25 lakh

Required percentage =  $(20/25) \times 100 = 80\%$

Hence, option (d) is correct.

34 (c)

**Assumption 1 is correct:** The passage mentions, "...when people's fundamental requirements are met, they develop a desire to preserve the ecosystem". This line validates the assumption that when people's fundamental needs are satisfied, they are able to care about the environment. Hence, assumption 1 is correct.

**Assumption 2 is correct:** This assumption aligns with the argument made in the lines, *“Economic development has long been a focus of economic strategies, but it is only in the last few decades that sustainability has risen to the centre of economic discourse and acquired substantial significance. According to modified neoclassical growth theories, to provide economic stability for future generations, it is critical to accomplish sustainability.”* That means, sustainability does not arise naturally in the course of growth and development, but needs a conscious effort. Further, the passage also mentions, *“resource scarcity and environmental damage”* pointing towards the same issue. Hence, assumption 2 is valid.

35 (a)

**Inference 1 is correct:** The passage states that U.S. capitalists *“had less need for workers and more people looking for jobs”* in the 1970s. This implies an oversupply of labour, which weakens workers' bargaining power in negotiating wages. The shift in supply and demand dynamics created an opportunity for employers to suppress wages. **Hence, inference 1 is correct.**

**Inference 2 is not correct:** While the passage mentions long work hours in the US, it doesn't provide any evidence about their happiness or life satisfaction compared to other countries. **Hence, inference 2 is not correct.**

36 (c)

**Option (a) is incorrect.** The following line from the passage *“We need to take the spirit of critical pedagogy with absolute seriousness”* indicates that there is a need to instil the spirit of critical pedagogy to promote the growth of students. However, this answer option, on the contrary, states critical pedagogy as hampering the growth of the students. **Hence option (a) is incorrect.**

**Option (b) is incorrect.** This option goes against the message conveyed in the passage. The passage marks the need to move away from bookish knowledge as evident from the line, *“seeing beyond the burden of bookish knowledge, overcoming the dead weight of ready-made facts, definitions and theories.”* It emphasises the need to instil critical thinking, rather than memorising and rote learning. **Hence option (b) is incorrect.**

**Option (c) is correct.** The passage revolves around the problems in the prevalent education system and the need to bring reforms in the same *“... students are hardly encouraged or trained to see beyond textbooks, ... The prevalent pattern of school examinations demands nothing more than the capacity to memorise.”* Hence the most logical inference is the need to bring reforms in the same. **Hence, option (c) is correct.**

**Option (d) is incorrect.** This option goes against the spirit of the passage, which argues for the facilitation of healthy discussions and developing critical thinking in students. **Hence option (d) is incorrect.**

37 (d)

**Option (a) is incorrect.** The first line of the passage negates unemployment as the main problem for India. It states that underemployment is the real problem. Hence most of the people are employed (not jobless), but their productivity is low due to underemployment. **Hence option (a) is incorrect.**

**Option (b) is incorrect.** Refer to the lines: *“What we have done is to put much of the capital in very selective sectors which are in any case very capital intensive.”* We have added capital to these sectors, but it has not helped in the creation of high-productivity jobs. **Hence option (b) is incorrect.**

**Option (c) is incorrect.** The following lines from the passage *“And that is where the real challenge of jobs is- creating well-paid high productivity jobs. India is a labour-abundant and capital-scarce country”* clearly indicate that there is no shortage of labour, but a lack of high productivity jobs. **Hence option (c) is incorrect.**

**Option (d) is correct.** Refer to the lines: *“We have the situation where much of the capital is working with very few workers. And we have a host of workers in agriculture in micro and small enterprises*

**where the capital is hardly present.** There is a lack of capital allocation in the labour-intensive sectors leading to a mismatch between capital and labour. **Hence option (d) is correct.**

**38 (a)**

There are 13 cards of the hearts suite.

So, there are 13 ways to draw a card of the same suit as that of the spare card kept on the table.

Total number of ways of drawing one card from the pack = 52.

Required probability =  $13/52 = 1/4$

**39 (d)**

There is only one way to draw the card same as the spare card (i.e. Ace of hearts)

So, required probability =  $1/52$

**40 (b)**

The spare card is of red color.

Number of cards that are not of red color in the pack = 26

So, number of ways of drawing a card that is not of the same color as that of the spare card = 26.

Required probability =  $26/52 = 1/2$

**41 (b)**

Number of ways to form a committee with 1 female and 4 males = number of ways of selecting 4 males out of six males  $\times$  number of ways of selecting 1 female out of 5 females =  ${}^6C_4 \times {}^5C_1 = 15 \times 5 = 75$

Hence, option (b) is the right answer.

**42 (a)**

There can be more females than males if there are 3, 4, or 5 females in the committee.

Number of ways to form a committee with 3 females and 2 males = number of ways of selecting 2 males out of six males  $\times$  number of ways of selecting 3 females out of 5 females =  ${}^6C_2 \times {}^5C_3 = 15 \times 10 = 150$

Number of ways to form a committee with 4 females and 1 male = number of ways of selecting 1 male out of six males  $\times$  number of ways of selecting 4 females out of 5 females =  ${}^6C_1 \times {}^5C_4 = 6 \times 5 = 30$

Number of ways to form a committee with 5 females and 0 male = number of ways of selecting 0 male out of six males  $\times$  number of ways of selecting 5 females out of 5 females =  ${}^6C_0 \times {}^5C_5 = 1 \times 1 = 1$

Total number of ways of forming the committee =  $150 + 30 + 1 = 181$

Hence, option (a) is the right answer.

**43 (c)**

Let the original price be Rs.  $x$  per book and new price be Rs.  $(x + 15)$  per book.

The number of books he could buy at original price =  $1050/x$

The number of books he could buy at the increased price =  $1050/(x+15)$

According to the question,

$$(1050/x) - [1050/(x + 15)] = 9$$

$$\text{Or } (1050)15 = 9x(x + 15)$$

$$\text{Or } x^2 + 15x - 1750 = 0$$

$$\text{Or } x = 35 \text{ or } -50$$

$$\text{As } x > 0, \therefore x = 35$$

Hence, option (c) is the right answer.

**44 (d)**

**Statement 1 is incorrect** as the passage does not touch upon or imply anything about the need for reducing the number of representatives. It only talks about using AI to train the customer care executives, not about replacing them altogether. **Hence, this statement is incorrect.**

**Statement 2 is incorrect** as the passage does not suggest a decline in customer satisfaction with automated responses. Also, the passage implies that AI-driven training can improve customer services as it mentions 'individualised training' at a large scale that was not possible with traditional methods that are 'expensive, time-consuming, and difficult to replicate realistically.' Since the use of AI is intended for an improvement in training, it is unlikely to lead to a decline in customer satisfaction. **Hence, this statement is incorrect.**

45 (c)

**Option (a) is incorrect** because the author states that there has been '*curiously little*' discussion on the difficulty of manufacturing the bomb, indicating that the discussion has not been holistic. **Hence, this option is incorrect.**

**Option (b) is incorrect** because the author states that there have been '*many reiterations of the useless statement*' about international control. This reflects the criticality of the discussion, therefore, to state that the discussion on atom bombs is useless is not correct as per the passage. **Hence, this option is incorrect.**

**Option (c) is correct** because the author states in the beginning that given the importance of the matter ('*how likely we all are to be blown to pieces by it within the next five years*'), there has not been enough discussion of the issue ('*as might have been expected.*'). **Hence, this option is correct.**

**Option (d) is incorrect** because the author notes that there have been several diagrams in the newspapers depicting the inner workings of the bomb ('*protons and neutrons doing their stuff*'). These are technical and hence '*not very helpful to the average man*'. **Hence, this option is incorrect.**

46 (b)

**Statement 1 is incorrect** as the passage does not state the difficulty of meeting the target. Instead, it focuses on steps that can be taken towards ensuring a low-carbon future for India as seen in the lines "*This calls for a phasing down of fossil-based energy sources in line with India's goal of achieving net zero by 2070.*" The given claim in the statement is extreme and is not based on the information provided in the passage. **Hence, this statement is incorrect.**

**Statement 2 is correct** as the passage states that green hydrogen can be deployed first in difficult-to-decarbonize sectors such as fertiliser and refinery industries, and later in heavy industries. The lines "*The industrial sector is the main driver for future growth of energy demand and emissions, and green hydrogen can play a critical role in initially decarbonizing the hard-to-abate industrial sectors, such as fertiliser and refinery industries, and later heavy industries, including iron and steel*" from the passage validate the given statement. **Hence, this statement is correct.**

47 (a)

Number of students ahead of Ghanshyam = 15.

Number of students behind Ghanshyam = 48

Total number of students = Number of students ahead of Ghanshyam + Number of student behind Ghanshyam + 1 (Ghanshyam himself)

Total number of students in the class =  $15 + 48 + 1 = 64$

Hence, option (a) is the right answer.

48 (b)

Average of entire class = Total weight of all the students/ No. of Students

$= \{(50 \times 40) + (60 \times 70) + (40 \times 90)\} / (40 + 70 + 90)$

$= 9800/200$

$= 49 \text{ kg}$

Hence, option (b) is the right answer.

49 (b)

Given,  $7x + 4y = 64$   $\{x, y \in \mathbb{Z}^+\}$

$4y$  and  $64$  are multiples of  $4$ .

$\therefore$  Value of  $x$  must also be a multiple of  $4$ .

Hence, option (b) is the right answer.

50 (c)

A number is divisible by  $125$ , if and only if the number formed by its last three digits is divisible by  $125$ .

So, the possible combinations for the last three digits are:  $000$ ,  $125$ ,  $250$  and  $500$ .

Now, the numbers of three digit numbers divisible by  $125 = 3$ .

The number of four-digit numbers divisible by  $125 = (4 \times 4) = 16$

4	X	X	X
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The number of five-digit numbers divisible by  $125 = 4 \times 4 \times 5 = 80$

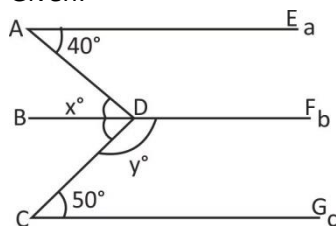
4	5	X	X	X
---	---	---	---	---

Hence, the required number of numbers  $= 3 + 16 + 80 = 99$ .

Hence, option (c) is the right answer.

51 (a)

Given:



$$\angle ADC = \angle ADB + \angle BDC$$

$$\angle ADB = \angle DAE = 40^\circ \text{ (alternate angles are equal)}$$

$$\angle BDC = \angle DCG = 50^\circ \text{ (alternate angles are equal)}$$

$$\therefore x = \angle ADB + \angle BDC = 40^\circ + 50^\circ = 90^\circ$$

$$\therefore x^\circ = 90^\circ$$

$$y + 50^\circ = 180^\circ \text{ (co-interior angles are supplementary)}$$

$$\text{or } y = 130^\circ$$

Thus,  $x^\circ = 90^\circ$  and  $y^\circ = 130^\circ$ .

Hence, option (a) is the right answer.

52 (c)

$$S_n = a(r^n - 1)/(r - 1)$$

$$\text{The sum of the first eight terms of a geometric series} = S_8 = a(r^8 - 1)/(r - 1)$$

$$\text{The sum of the first four terms of a geometric series} = S_4 = a(r^4 - 1)/(r - 1)$$

According to the question,

$$a(r^8 - 1)/(r - 1) = 10001 \times a(r^4 - 1)/(r - 1)$$

$$\text{Or } (r^8 - 1)/(r^4 - 1) = 10001$$

$$\text{Or } (r^4 + 1) = 10001$$

$$\text{Or } r^4 = 10001 - 1 = 10000$$

$$\text{Or } r = (\pm 10)$$

Hence, option (c) is the right answer.

53 (a)

Volume of sphere =  $(4/3) \pi r^3$

Surface area of a sphere =  $4\pi r^2$ , where r is the radius.

According to the question,

$$\{(4/3) \pi r^3\} / 4 \pi r^2 = 1/1$$

So,  $r = 3$  units

Volume of sphere =  $(4/3) \times \pi \times (3)^3 = 36\pi$  cubic units

Hence, option (a) is the right answer.

54 (b)

The next train is supposed to start at 17:00 hours.

Therefore, the previous train had left at 14:30 hours.

The announcement was made 40 minutes after the train had left.

The time when announcement was made = 14:30 + 40 minutes = 15:10 hours

Hence, option (b) is the right answer.

55 (a)

**Option (a) is correct.** This statement accurately reflects the crucial message conveyed by the author. The passage in the lines, "*The role of intelligence in national security has grown significantly in recent years thanks to the **rise of international terrorism, the growth of cross-border criminal networks, renewed economic competition, the increasing need to protect intellectual property, the return of great power rivalry, and the impact of new technologies that are reshaping the domestic and global dynamics of an interconnected international society***" discusses how various factors, including terrorism, criminal networks, economic competition, and technological advancements, have heightened the role of intelligence in national security. It also highlights the emergence of intelligence diplomacy as a response to these challenges. **Hence, this option is correct.**

**Option (b) is incorrect.** While the passage mentions the US' intelligence-sharing arrangements with its traditional allies and NATO/EU partners, it does not imply that intelligence diplomacy is solely focused on these relationships. The passage discusses the broader context of intelligence cooperation in response to global challenges, not limited to specific alliances. **Hence, this option is not correct.**

**Option (c) is incorrect.** While the passage does mention India's shift towards building productive intelligence partnerships and its participation in events like the Raisina Dialogue, it is nowhere mentioned that currently India's intelligence diplomacy is with less number of countries and needs to increase as suggested in this answer option. Also, this option narrows down its domain to developing countries. **Hence, this option is not correct.**

**Option (d) is incorrect.** The passage discusses the meaning of intelligence diplomacy and the countries that practice it. Though the passage advocates it, to state that every country should adopt it would be an extreme statement, as certain countries might have their own (differing) realities. **Hence, this option is not correct.**

56 (a)

**Option (a) is correct.** This statement accurately reflects the main message conveyed by the author. Refer to the lines "*These generative agents will power companions that introduce new categories of **social relationships, and change old ones. They may well radically change the attention economy.***" The author discusses how generative AI systems have the potential to revolutionize personal computing, enable new social relationships, and change the attention economy. Further, the lines "*Other critics highlight how they foreshadow vastly more powerful future systems that might threaten humanity's survival*" show the negative aspect of generative AI. So, generative AI has the potential to transform not only the economy, but also the society. **Hence, this option is correct.**

**Option (b) is incorrect.** The passage does not discuss the context of the future of society with or without generative AI. As per the passage, it is impacting the society in manifold ways, but to assume that without it a future society or workplace cannot be imagined would not be correct. It would be an extreme proposition. **Hence, this option is not correct.**

**Option (c) is incorrect.** The core theme of the passage is on benefits and challenges associated with generative AI. However, the given option states that it has made the work of people in language-based industries easy and efficient which is not correct as per the passage because the passage does not state so. Also, it focuses only on the benefits and ignores the challenges. **Hence, this option is not correct.**

**Option (d) is incorrect.** The passage nowhere explicitly discusses the context of jobs being threatened due to generative AI, that too specific to language-based industries. So, this option is beyond the scope of the passage. **Hence, this option is not correct.**

57 (d)

Area of the floor of a conical tent =  $\pi r^2 = 616 \text{ ft}^2$

Or  $r^2 = 616 \times 7/22$

Or  $r = \sqrt{196}$

Or  $r = 14 \text{ ft.}$

Slant height (l) =  $\sqrt{[(14)^2 + \{2\sqrt{15}\}^2]} = 16 \text{ ft.}$

Area of the canvas required for the tent =  $\pi r l = (22/7) \times (14) \times (16) = 704 \text{ ft}^2$

Hence, option (d) is the right answer.

58 (d)

Number of students ahead of Minakshi = 15

Number of students behind Minakshi = 28

Total number of students who passed the test =  $15 + 28 + 1 = 44$

Total number of students in the class = Students who passed the test + Students who failed the test + Students who did not appear for the test =  $44 + 6 + 5 = 55$

Hence, option (d) is the right answer.

59 (a)

Mirror image time = 3:40

Real time =  $23:60 - 3:40 = 20:20$

Thus, 8:20 is the real time.

Hence, the required difference =  $8:20 - 3:40 = 4 \text{ hrs. } 40 \text{ minutes}$

Hence, option (a) is the right answer.

60 (c)

Total number of prime numbers below 100 = 25

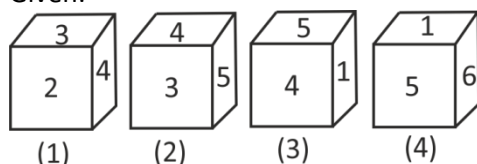
Total number of composite numbers below 100 = 75

Probability that one number chosen randomly is not prime =  $75/100 = \frac{3}{4}$

Hence, option (c) is correct.

61 (c)

Given:



On comparing 3<sup>rd</sup> and 4<sup>th</sup> dice, 1 and 5 are common, so remaining faces must be opposite to each other. Thus, 4 is opposite to 6.

Hence, option (c) is the right answer.



62 (a)

**Option (a) is correct.** Refer to the last line of the passage: *"Some have speculated that polar bears might adapt to the longer ice-free seasons due to climate warming by acting like their grizzly bear relatives and either resting or eating terrestrial food."* The author talks about change in external environment (longer ice-free seasons) triggering adaptation mechanisms among polar bears. **Hence, it is correct to say that adaptation is driven by changes in external environment.**

**Option (b) is incorrect.** The passage, unlike the given option, does not discuss the possibility of polar bears becoming extinct. It limits the discussion to starvation only. Rather, the lines *"Some have speculated that polar bears might adapt to the longer ice-free seasons due to climate warming by acting like their grizzly bear relatives and either resting or eating terrestrial food"* confirm that they might adapt to ice-free seasons. **Hence, this option is not correct.**

**Option (c) is incorrect.** The given statement is opposite to the core discussion of the passage. The passage is about how polar bears lose weight despite having strategies to maintain energy reserves. But this option states the opposite. **Hence, this option is not correct.**

**Option (d) is incorrect.** While this statement provides specific information about the weight loss observed in polar bears during summer, it does not fully capture the main inference from the passage. The main focus of the passage is on the increased risk of starvation due to extended ice-free seasons caused by climate warming, rather than solely on the rate of weight loss observed in polar bears. **Hence, this option is not correct.**

63 (d)

*Note: The question is about **invalid** assumptions.*

**Assumption 1 is valid** because the passage discusses how global growth projections for 2024-25 are impacted by factors like high debt, inflation, and low productivity growth as seen in the lines, *"The forecast for 2024–25 is, ... a **withdrawal of fiscal support** amid high debt weighing on economic activity, and **low underlying productivity growth**. Inflation is falling faster than expected in most regions, amid unwinding supply-side issues and restrictive monetary policy."* These lines suggest that global economic projections are indeed influenced by multiple factors. **Hence, the given assumption is correct.**

**Assumption 2 is valid** as the passage mentions that inflation is expected to fall in the coming years, alleviating concerns about a hard landing, as stated in the lines, *"With disinflation and steady growth, the likelihood of a hard landing has receded, and risks to global growth are broadly balanced."* Hence, the decrease in inflation is portrayed as a positive development that will contribute towards balancing the risks to global growth. **Hence, the given assumption is correct.**

64 (d)

**Assumption 1 is incorrect:** The passage mentions the negotiator's pledge to pursue the objectives *"... in keeping with the technologies..."* highlighting the crucial role of technology in this field. **Hence, assumption 1 is incorrect.**

**Assumption 2 is not correct:** The passage mentions the fundamental and irreversible shift that warming above 1.5 degrees could cause, highlighting the immense challenge of mitigating climate change. The issue of tackling global warming without impacting our lives is not discussed in the passage as such. **Hence, assumption 2 is not correct.**

65 (c)

**Option (a) is not correct:** The passage is about dengue outbreak, and how it is spreading to newer areas. However, there is no categorization of the affected countries as developing or developed. **Hence, option (a) is not correct.**

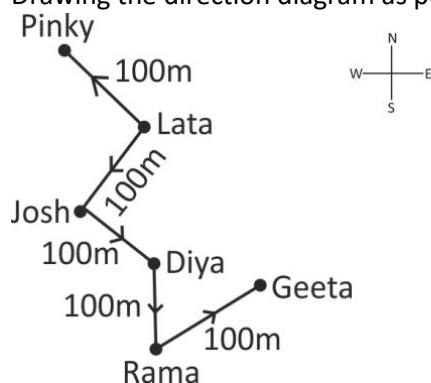
**Option (b) is not correct:** While the passage mentions El Nino alongside rising temperatures and humidity, it doesn't elaborate on its specific role or provide evidence to support a direct causal link to the dengue outbreaks. This answer option is too narrow to capture the crucial message of the passage. Hence, option (b) is not correct.

**Option (c) is correct:** The statement is correct in the context of the passage. The core theme of the passage is related to the spread of dengue in newer countries which are facing rising temperatures due to climate change as seen in the lines *"As temperatures continue to rise, more areas will become habitable for these mosquitoes. In the future, the belt of transmission is going to continue expanding northwards and upwards."* Hence, option (c) is correct.

**Option (d) is not correct as both options (a) and (b) are incorrect.**

66 (c)

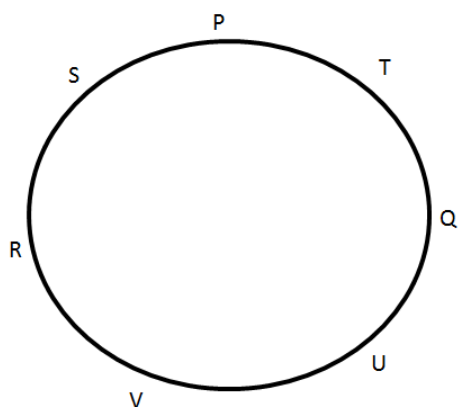
Drawing the direction diagram as per the question:



The house of Geeta is in south-east direction with respect to the house of Pinky. Hence, option (c) is the right answer.

67 (a)

The seating arrangement of the seven friends is shown in the figure given below:



As seen in the figure R and V are next to each other. The other two statements are not correct. Hence, option (a) is the correct answer.

68 (c)

As shown in the picture, R is sitting to the right of S. Hence, option (c) is the correct answer.

69 (b)

R and S are sitting between P and V on the left side of the figure and T, Q and U are sitting between them on the right side of the figure. Hence, option (b) is the correct answer.

### Explanation for Questions 70 to 73:

Using Statements 1, 2, 3, 5, 6, we get:

Student	College	Subject
A		
B	4	Maths, Geography
C	2, 7	English
D	1	
E	5	Hindi
F		
G		Sanskrit

As per statement 4: the student in college 7 studies Science and A is not the one who goes to college 7. So, F must be the one who goes to college 7 and study science.

Student	College	Subject
A		
B	4	Maths, Geography
C	2, 7	English
D	1	
E	5	Hindi
F	7	Science
G		Sanskrit

Using statement 7, the student in college 2 studies Geography, we can infer that A has to be the person in college 2 studying Geography.

Student	College	Subject
A	2	Geography
B	4	Maths, Geography
C	2, 7	English
D	1	
E	5	Hindi
F	7	Science
G		Sanskrit

We can now infer from the above table that B has to study History and D has to study Maths. The final table has been shown below:

Student	College	Subject
A	2	Geography
B	4	History
C	3/6	English
D	1	Maths
E	5	Hindi
F	7	Science
G	3/6	Sanskrit

70 (b)

IF C goes to College 3, G has to go to college 6.

Hence, option (b) is the correct answer.

71 (a)

Clearly from the table, the subject of A is Geography.  
Hence, option (a) is the correct answer.

72 (c)

As shown in the table, D studies maths.  
Hence, option (c) is the correct answer.

73 (d)

As given in the table, A goes to college 2.  
Hence, (d) is the correct answer.

74 (a)

Option (a) is correct: Food provides energy for essential activities, builds, and protects the body, and regulates its processes. This highlights the crucial role of food in maintaining physical health and survival. Sharing food signifies social acceptance, friendship, and respect. This emphasizes the importance of food in fostering social bonds and connections. Therefore, the message goes beyond just the physical necessity of food and emphasizes its broader impact on both individual and social well-being. Hence, option (a) is correct.

Option (b) is not correct: The statement is correct in the context of the passage. However, it focuses only on one aspect of food which is providing energy. The passage also focuses on the social aspect of food sharing which is not mentioned in this answer option. Hence, option (b) is not correct.

Option (c) is not correct: The statement is correct in the context of the passage. However, it touches upon only a part of the analysis made in the passage. The regulatory and social functions of food and food sharing are not covered in this answer option. Therefore, this answer option does not qualify to be the most rational, logical, and crucial message conveyed by the passage.

75 (b)

Option (a) is not correct: The passage emphasizes the importance of this integrated approach, but does not explicitly claim it as the exclusive method. Therefore, assuming this integrated approach as the only meaningful one is not correct in the context of the passage. There could be other alternative approaches to understanding urban social structure. Hence, option (a) is not correct.

Option (b) is correct: The passage differentiates between '*urban as a quality of life and city as a physical place*'. This highlights that being urban isn't solely defined by geography. The passage emphasizes the importance of considering demographic, ecological, and socio-cultural factors for a holistic understanding of "*urban social structure*." Therefore, the message goes beyond a simple definition and encourages a broader perspective on what constitutes "urban." It suggests that understanding the social and cultural aspects alongside the physical environment is crucial for comprehending urban life. Hence, option (b) is correct.

Option (c) is not correct: The statement refers to rural social structure, which is not discussed in the passage. Hence, this option is beyond the scope of the passage. Hence, option (c) is not correct.

Option (d) is not correct: The passage specifically states that while used interchangeably, the academic understanding of these terms is actually different. "City" now refers to a physical location, while "urban" denotes a specific quality of life associated with cities. Hence, option (d) is not correct.

76 (c)

Option (c): 'A×C' stands for 'A' is the brother of 'C'; 'C + B' stands for 'C' is the father of 'B'.  
Hence, 'A' is the uncle of 'B'.

77 (d)

A ÷ C + B: It means that A is the aunty of B. However, as the gender of B is not known, he/she may either be neice or nephew of A.

### Explanations for Questions 78 to 80:

In terms of **height**, we have:

Ramu < Manu ..... A

Tinu < Manu ..... B

Tinu < Ashu..... C

Anu < Ashu ..... D

Manu < Anu ..... E

Simu < Anu ..... F

Manu < Simu ..... G

So, Tinu < Manu < Anu < Ashu (from B, E and D)

Manu < Simu < Anu (from G and F)

Hence, we get: Tinu < Manu < Simu < Anu < Ashu

Now, Ramu < Manu (from A)

Thus, the overall sequence becomes:

Ramu < Tinu < Manu < Simu < Anu < Ashu

OR Tinu < Ramu < Manu < Simu < Anu < Ashu.

In terms of **weight**, we have:

Simu < Ramu .....A

Simu < Tinu .....B

Ramu < Ashu .....C

Ashu < Manu .....D

So, Simu < Ramu < Ashu < Manu (from A, C and D)

Now, Simu < Tinu (from B)

Thus, the overall sequence becomes:

Simu < Tinu < Ramu < Ashu < Manu

OR Simu < Ramu < Tinu < Ashu < Manu

OR Simu < Ramu < Ashu < Tinu < Manu

OR Simu < Ramu < Ashu < Manu < Tinu

**78 (a)**

The descending order of heights is:

Ashu > Anu > Simu > Manu > Tinu > Ramu

OR Ashu > Anu > Simu > Manu > Ramu > Tinu

Hence, Simu is third from the top.

**79 (d)**

Data is inadequate as no clue regarding Anu's weight is given.

**80 (c)**

Manu, Ramu and Tinu are shorter than Simu.

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