

ANSWERS & EXPLANATIONS

GENERAL STUDIES (P) TEST – 4291 (2024)

1 (a)

Total time from 6:00 a.m. on Friday to 9:00 p.m. on Saturday = $24 + 12 + 3 = 39$ hours
In first hour, it gains 3 sec in 5 min. So, in first hour it gains $(3/5) \times 60 = 36$ sec.
In second hour, it loses 6 sec in 5 min. So, in second hour it loses $(6/5) \times 60 = 72$ sec.
So, in 2 hours it loses $72 - 36 = 36$ sec.
So, in 38 hours it loses $(36/2) \times 38 = 684$ sec.
In 39th hour, it will gain $36 + (39 - 1)36 = 36 \times 39 = 1404$ sec.
So, total gain in time = $1404 - 684 = 720$ sec = 12 mins.
So, the time displayed by the clock at 9 p.m. on Saturday = 9:00 p.m. + 12 minutes = 9:12 p.m.
So, option (a) is correct.

2 (b)

Option (a) is incorrect. The main theme of the passage is awareness and perception of commercial nuclear energy. However, the given option mentions safe development of new reactors which is not the core theme of the passage. Hence, this option is not the most rational inference of the passage.

Option (b) is correct. The lines “*This perception is often based on three global nuclear accidents, its false association with nuclear weapons, and how it is portrayed on popular television shows and films*” and “*DOE also works to provide accurate, fact-based information about nuclear energy through its social media and STEM outreach efforts to educate the public on the benefits of nuclear energy*”, show that DOE has taken various steps to address the perception issues of commercial nuclear power.

Option (c) is incorrect. The given option is not a rational inference because it does not include the context of changing perceptions about nuclear power. Hence, as per the passage, this is not correct.

Option (d) is incorrect. The given option is not correct because the role of the people in busting false perception of nuclear energy is not discussed in the passage. Hence, this is not the most logical inference of the passage.

3 (b)

Option (a) is incorrect. The context of the role of the global organizations in preventing the spread of invasive species is not a part of the passage. Hence, this option is not the best crux of the passage.

Option (b) is correct. The given option is the best crux of the passage as can be seen in the lines “*The global economy, with increased transport of goods and travel, has facilitated the movement of live species over long distances and beyond natural boundaries*” and “*... tremendous impact on the health of plants, animals and even humans—threatening lives and affecting food security and ecosystem health. Their negative impact on the economy costs countries billions of dollars...*”

Option (c) is incorrect. The option could be a rational implication which explains what should be done to prevent the spread of invasive species causing dire socio-economic consequences, but it is not the crux as it does not present the summary of the passage. Also, eradication of species at their origin or source sounds a bit extreme. Hence, this option is not the best crux of the passage.

Option (d) is incorrect. The context of proper regulations for the prevention of the spread of invasive species is not a part of the passage. Hence, this option is not the best crux of the passage.

4 (d)

Option (a) is not correct. The statement mentioned is correct, but it is not the most rational message conveyed by the author. The passage revolves around the central idea of how women could be involved in cities as equal participants. **Hence, it is not a correct option.**

Option (b) is not correct. The passage revolves around the central idea of how women can be made to feel safe and involved in cities. Improvement in social infrastructure is among the many steps that can be taken for the inclusion of women in cities. The passage does not mention that it's the most important factor. **Hence, it is not a correct option.**

Option (c) is not correct. "Men devoting more time to household work" is not mentioned in the passage and therefore is beyond the scope of the passage. **Hence, it is not a correct option.**

Option (d) is correct. To make women feel safe, secure and inclusive in cities several steps in terms of governance, urban planning need to be taken. The passage says that **"Change is needed in many arenas including physical and social infrastructure, safe spaces, services such as transport and response to gender-based violence"**. It further says that **"The public domain needs to be made more gender friendly and inclusive of all people of diverse ages, socio-economic statuses, genders, abilities, and ethnicities"**. Hence, it is a correct option.

5 (c)

$337 \text{ days} = 48 \text{ weeks} + 1 \text{ day}$

The yearly calendar will repeat after 7 years when the 7 odd days add up to make a week.

So, option (c) is correct.

6 (b)

At 10 o'clock, the hour hand is at 10 and the minute hand is at 12, i.e., they are 50 minutes spaces apart. To be together, the minute hand must gain 50 minutes over the hour hand.

Now, 55 minutes spaces will be gained in 60 minutes.

So, 50 minutes spaces will be gained in $((60/55) \times 50) = 600/11 = 54(6/11)$ minutes.

The hands will coincide at $54(6/11)$ minutes past 10.

So, option (b) is correct.

7 (b)

Given sequence: 5 e c 7 2 9 8 y 7 5 6 # 1 k 8 6 g 8 7 2 f 4 5 4 * 6

Digits preceded by a consonant and followed by a prime number are: (c 7 2); (y 7 5); (g 8 7) and (f 4 5)

So, required value = 4

So, option (b) is correct.

8 (a)

Clearly, we have:

$A = B - 300 \dots(i)$

$D = E - 500 \dots(ii)$

$A + C = 2E \dots(iii)$

$B + D = A + C = 2E \dots(iv)$

$A + B + C + D + E = 4500 \dots(v)$

Or $2E + 2E + E = 4500$ (Since, $B + D = A + C = 2E$)

Or $5E = 4500$

Or $E = \text{Rs. } 900$

$D = E - 500 = 900 - 500 = \text{Rs. } 400$

$B + D = 2E$

Or $B = 2E - D = 2 \times 900 - 400 = \text{Rs. } 1400$

$A = B - 300 = 1400 - 300 = \text{Rs. } 1100$

$A + C = 2E$

Or $C = 2E - A = 2 \times 900 - 1100 = \text{Rs. } 700$

So, option (a) is correct.

9 (d)



Except , all are punctuation marks. So, it is different from the rest.

So, option (d) is correct.

10 (d)

$$P - Q = (0.2 X + 0.32 Y) - (0.25 X + 0.25 Y)$$

$$= 0.07 Y - 0.05 X$$

P - Q may be positive or negative depending on values of X and Y. So, nothing can be concluded.
So, option (d) is correct.

11 (c)

$$L = 50$$

$$C = 100$$

$$D = 500$$

$$M = 1000$$

Clearly, $D + D = M$

So, option (c) is correct.

12 (b)

Let the fixed amount be Rs. x and varying amount be Rs. y per unit.

We are given,

$$x + 350y = 3040 \dots\dots\dots(1)$$

$$x + 436y = 3728 \dots\dots\dots(2)$$

On solving equation (1) and (2), we get:

$$x = 240 \text{ and } y = 8$$

$$\therefore \text{Amount of bill for 523 units} = 240 + 523 \times 8 = \text{Rs. } 4424$$

So, option (b) is correct.

Explanation for Questions 13 and 14:

One of them is a volleyball player and studies English and History. M is a boxer. The boxer studies Mathematics and Accounts.

| Person | Sports | Subjects |
|--------|------------|-----------------------|
| | Volleyball | English, History |
| M | Boxing | Mathematics, Accounts |
| | | |
| | | |

Both badminton players study Mathematics. One badminton player also studies Physics.

| Person | Sports | Subjects |
|--------|------------|-----------------------|
| | Volleyball | English, History |
| M | Boxing | Mathematics, Accounts |
| | Badminton | Mathematics, Physics |
| | Badminton | Mathematics |

J and K play badminton. J studies Science.

So, Final arrangement:

| Person | Sports | Subjects |
|--------|------------|-----------------------|
| L | Volleyball | English, History |
| M | Boxing | Mathematics, Accounts |
| K | Badminton | Mathematics, Physics |
| J | Badminton | Mathematics, Science |

13 (a)

14 (a)

15 (b)

Option (a) is incorrect. The passage is not about the type of leadership in the workplace but about certain differences in the approach of young generations and past generations towards their professional lives. Further, the passage only says that the “command and control leadership is questioned” and not that command and control leadership is NOT successful.

Option (b) is correct. This statement captures the crux of the passage which is how the approach of young generation towards their professional lives differs from that of past generations. Passage says that younger generation “expedite their progress up the ladder” and “gladly jump the ship” unlike past generations who used to see their jobs as a “surety in a world of uncertainty”. This confirms risk taking ability of young generations.

Option (c) is incorrect as the passage does not compare professional successes of young and old generations. It only indicates that young generation does not bother much about job security. Faster career progression is more important for them. Moreover the author has given us no clue regarding what ‘being successful’ means to him. The given statement is beyond the scope of this passage.

Option (d) is incorrect. The passage only talks about how past generations preferred sticking to a single job throughout their career, whereas young generations are more likely to switch their jobs to meet their career ambitions. There is no ethical analysis involved here. Hence, the given statement is incorrect.

16 (c)

Statement 1 is correct. The passage clearly says, “**Zhengzhou in Henan province was one of the most enthusiastic pioneers of sponge city construction, allocating nearly 60 billion yuan to the programme from 2016 to 2021**”. These lines imply that heavy investment is needed for the development of Sponge cities. **Hence, it is a correct statement.**

Statement 2 is correct. A number of activities are associated with sponge cities. The passage says “**Those solutions included the use of permeable asphalt, the construction of new canals and ponds and also the restoration of wetlands**”. From these lines, it is clear that sponge cities initiative includes wetland restoration, which is an environmentally sustainable initiative. **Hence, it is a correct statement.**

17 (b)

Statement (a) is not correct. China has recently been hit by floods, causing heavy damage in urban areas. However, the central theme of the passage revolves around the initiative of “sponge city” and its effectiveness in controlling floods. Therefore, this statement cannot be said to reflect the crux of the passage. **Hence, it is not a correct statement.**

Statement (b) is correct. The passage revolves around the efficiency of sponge cities in controlling urban floods. The passage mentions the launch of the sponge city initiative, its working, and how effective it is in regulating floods and drought. The passage says, “**The sponge city initiative was designed to make greater use of lower-impact “nature-based solutions”**”. It further says, “**Even if sponge city measures had been implemented in full, they would have been unable to prevent this year’s disasters**”. Therefore, it can be considered as the crux of the passage.

Statement (c) is not correct. According to the passage, Chinese cities are vulnerable to drought and floods. However, nowhere is it mentioned that drought and floods occur simultaneously. **Hence, it is not a correct statement.**

Statement (d) is not correct. It is not mentioned in the passage that sponge city initiative is aligned with the climate goals of China. **Hence, it is not a correct statement.**

18 (a)

Total hours from 5 a.m. on Friday to 11 a.m. on next day = 30 hours

The time gained by the hand watch in this duration = $(8 + 12) = 20$ minutes

So, the hand watch gains 20 minutes in 30 hours

So, the hand watch gains 8 minutes in $(30/20) \times 8 = 12$ hours

Required time = 5 a.m. on Friday + 12 hours = 5 p.m. on Friday

Thus, the watch shows the correct time at 5 p.m. on Friday.

So, option (a) is correct.

19 (a)

Difference in minutes between the two clocks in one hour = $5 - 3 = 2$ minutes

Total number of hours from 6 a.m. today to 10 p.m. on next day = $24 + 12 + 4 = 40$ hours

Difference in minutes between the two clocks in 40 hours = $2 \times 40 = 80$ minutes

So, option (a) is correct.

20 (d)

The time shown by the mirror image of the clock = 12 hours – 4 hours 35 minutes = 7 hours 25 minutes

So, option (d) is correct.

21 (b)

It is given that birthday of X = 8th June, 1996 = Monday

First birthday of X = 8th June, 1997 = Tuesday {since in non-leap year there is 1 odd day, hence Monday + 1 = Tuesday}

Second birthday of X = 8th June, 1998 = Wednesday

Third birthday of X = 8th June, 1999 = Thursday

Fourth birthday of X = 8th June, 2000 = Saturday {since in leap year there are 2 odd days, hence Thursday + 2 = Saturday}

Fifth birthday of X = 8th June, 2001 = Sunday

Sixth birthday of X = 8th June, 2002 = Monday

Seventh birthday of X = 8th June, 2003 = Tuesday

Eight birthday of X = 8th June, 2004 = Thursday {since in leap year there are 2 odd days, hence Tuesday + 2 = Thursday}

Number of times his birthday fell on Saturdays or Wednesdays from 1997 to 2004 = 2

Therefore, he goes to temple = 8 - 2 = 6 times

Hence, option (b) is the correct answer.

22 (a)

Let the present ages of P, P's son and P's father be x years, y years and z years respectively.

At present, the sum of the ages of P's father and P is 120 years.

So, $x + z = 120$

Or $x = 120 - z$

When P will be as old as P's father is now, P will be six times as old as P's son is now.

So, $z = 6y$

But at that time P's son will be seven years older than what P is now.

So, $y + (z - x) = x + 7$

Or $y + z = 2x + 7$

Or $y + z = 2(120 - z) + 7$ (since, $x = 120 - z$)

Or $y + 3z = 247$

Or $y + 3 \times 6y = 247$ (since, $z = 6y$)

Or $19y = 247$

Or $y = 13$

So, $z = 6y = 6 \times 13 = 78$ years

And $x = 120 - z = 120 - 78 = 42$ years

After 10 years, P's age = $x + 10 = 42 + 10 = 52$ years.

Hence, option (a) is the correct answer.

23 (c)

Income on the 1st day of his business = x

Income on the 2nd day of his business = 3x

Income on the 3rd day of his business = $3 \times (3x) = (3)^2 x$

Income on the 4th day of his business = $3 \times (3)^2 x = (3)^3 x$

So, Income on the pth day of his business = $(3)^{p-1} x$

Hence, option (c) is the correct answer.

Explanation for Questions 24 to 26:

The one who likes Dehradun works in the field of Information Technology only with T. Thus, only 2 people work in the field of Information Technology.

V neither works with T nor in the field of Finance. So, V works in the field of Healthcare. V does not like Mukteshwar.

Z works with V. So, Z also works in the field of Healthcare.

W likes Ranikhet.

| Person | Field | Hill station |
|--------|------------------------|-----------------------|
| | Information Technology | Dehradun |
| T | Information Technology | |
| V | Healthcare | Mukteshwar |
| Z | Healthcare | |
| W | | Ranikhet |
| | | |
| | | |

X works with only one person. X does not like Dehradun and does not work in Healthcare. So, X works in the field of Finance with only one another person. Thus, it is clear that three persons work in the field of Healthcare.

| Person | Field | Hill station |
|--------|------------------------|-----------------------|
| U/Y | Information Technology | Dehradun |
| T | Information Technology | |
| V | Healthcare | Mukteshwar |
| Z | Healthcare | |
| W | Healthcare/Finance | Ranikhet |
| X | Finance | |
| U/Y | Healthcare/Finance | |

Y likes Badrinath.

| Person | Field | Hill station |
|--------|------------------------|-----------------------|
| U | Information Technology | Dehradun |
| T | Information Technology | |
| V | Healthcare | Mukteshwar |
| Z | Healthcare | |
| W | Healthcare/Finance | Ranikhet |
| X | Finance | |
| Y | Healthcare/Finance | Badrinath |

The one who likes Mukteshwar works with the one who likes Rishikesh. So, they work in field of Healthcare because three persons work in the field of Healthcare.

Y works with the one who likes Nainital. W does not work with Y.

Final arrangement:

| Person | Field | Hill station |
|--------|------------------------|--------------|
| U | Information Technology | Dehradun |
| T | Information Technology | Mussoorie |
| V | Healthcare | Rishikesh |
| Z | Healthcare | Mukteshwar |
| W | Healthcare | Ranikhet |
| X | Finance | Nainital |
| Y | Finance | Badrinath |

24 (b)

Y works in Finance field and likes Badrinath hill station.

25 (c)

V works in Healthcare sector and likes Rishikesh hill station.

26 (c)

Except (X, Y) all others work in different fields.

27 (d)

Minimum number of matches that must be played = $45 - 1 = 44$

Hence, option (d) is the correct answer.

28 (d)

Let the husband's age be x .

Let the wife's age be y .

Let the son's age be z .

According to the question,

$$x + 2y + 3z = 85 \text{(1)}$$

$$3x + 6y + 9z = 255$$

$$x + 2y + 3z = 85 \text{(2)}$$

$$4x + 8y + 12z = 340$$

$$x + 2y + 3z = 85 \text{(3)}$$

All the three equations are essentially the same. Hence, the above system of equations will give no unique solution.

Thus, the son's age can't be determined.

Hence, option (d) is the correct answer.

29 (a)

Statement 1 is correct. Lampedusa, a Sicilian island, is situated nearer to Africa than mainland Italy. It is a popular destination for migrant traffickers as well. These facts indicate towards its accessibility to African migrants. **Hence, it is a correct statement.**

Statement 2 is not correct. The Italian government has urged the European Union to join efforts in seeking Tunisia's cooperation in controlling smuggling operations. However, the passage does not mention that the number of migrants coming to Italy has decreased as a result of this. **Hence, it is not a correct statement.**

30 (b)

Option (a) is not correct. People migrate to other countries and regions for multiple reasons. However, the passage does not mention any reason as to why people migrate. **Hence, it is not a correct option.**

Option (b) is correct. According to the passage, 41 people recently died in a boat accident. Despite these accidents, the migrants continue to emigrate to Italy. The passage says that **"there have been numerous shipwrecks of smugglers' boats leaving from Tunisia bound for Italy"**. The passage further says that **"more than 93,000 migrants have arrived in Italy so far this year, more than twice the 45,000 who arrived during the same period in 2022"**. This implies that even after the danger of accidents, people continue to migrate. **Hence, it is a correct option.**

Option (c) is not correct. Even though the reasons for migration can be divided into two factors of push and pull, the passage does not mention or indicate such a classification. The answer statement should be within the scope of the information given in the passage. Therefore, it does not reflect the crux of the passage. **Hence, it is not a correct option.**

Option (d) is not correct. The process of migration might have led to changes in the demography of host countries, but the passage does not mention these. **Hence, it is not a correct option.**

31 (b)

Option (a) is incorrect. The given option is incomplete in the sense that it only talks about the positive impact of cell phones and ignores the other side of the story. But the passage also includes the negative side of cell phones. Hence, this option is not correct.

Option (b) is correct. Consider the lines *"While this change has done wonders for so many reasons, research shows that excessive cell phone usage may have negative impacts on mental health."* It captures the essence of the passage which is that cell phones are a good servant but a bad master. Hence, this is the best crux of the passage.

Option (c) is incorrect. Giving up on cell phones as a solution to the problem of excessive use of phones is not discussed in the passage. Thus, this option is beyond the scope of the passage and is incorrect.

Option (d) is incorrect. The given option is not correct because the context of analysing the users' psychology behind the use of phones and working on the same to regulate the use of phones is not discussed in the passage.

32 (b)

Option (a) is incorrect. The given option is not correct because the passage is specific to democracies and does not talk about other political models. Hence this option is beyond the scope of the passage.

Option (b) is correct. Refer to the lines "... *current climate of widespread mistrust in the institutionalized and representative mediation of politics*" and "... *has led to greater familiarity with a protest-based repertoire of opinions and/or actions, and an enhanced tendency towards extremism and radicalization, particularly among younger generations.*" These lines show that protest-based culture arises due to the mistrust in the mediation of politics and eventually promotes extremism and radicalisation in youth. Hence, to end extremism and radicalisation, it is important to build trust.

Option (c) is incorrect. The lines "*In contemporary democracies, protest feeds on the difficulties currently facing political representation and is expressed within the **framework of direct rather than representative** democracy.*" This shows that protest is expressed in the framework of direct democracy, but this does not mean that it's better than representative democracy, as the passage does not compare them.

Option (d) is incorrect. The passage does not mention extremist and radicalized youth contributing to politics as a desired trait. Hence, this option is not correct.

33 (c)

Option (a) is incorrect. The polar bears being the worst sufferers of climate change is not mentioned in the passage. The example of polar bears is chosen to highlight the impact of sea ice loss, but it has not been compared to any other species to conclude that it is the worst sufferer. Hence, this is not the best crux of the passage.

Option (b) is incorrect. The given option is not correct because it states that minimizing conflicts with humans will conserve polar bears' habitat, food, and reproduction. However, these issues of polar bears are not majorly due to conflicts, but rather due to the loss of sea ice. Hence, this is not the best crux of the passage.

Option (c) is correct. The lines "*The **plight of polar bears**, for example, has become a symbol of global warming in the Arctic due to the cascading impacts of sea ice loss. Polar bears that do survive are less likely to produce healthy offspring, reducing the population over generations.*" validate the given statement. Hence, this is the best crux of the passage.

Option (d) is incorrect. The given option seems to be correct, but it is not. It could be a rational implication and not the crux of the passage. It highlights what should be done to protect polar bears, while the passage is more descriptive in nature.

34 (c)

Option (a) is incorrect. The given option is not correct because the passage does not talk about Information Technology education in schools.

Option (b) is incorrect. The line "*Increasing connectivity alone will not help in the goal of granting universal access to higher quality and inclusive education*", highlights the potential of connectivity to bridge the gaps in accessing education. However, the given option says that increasing connectivity has caused a wide gap in digital education, which is incorrect. Hence, this option is not the best crux of the passage.

Option (c) is correct. The lines "*Granting universal access implies making sure that the benefits of education and technology **are accessible to everyone**; this means, also to girls and to children and youth belonging to minorities, indigenous and marginalized groups, refugees, and displaced learners, as well as children with disabilities.*" These lines capture the essence of the passage. Hence, this is the best crux of the passage.

Option (d) is incorrect. The given option is framed like an assumption and not like a crux. The passage does not mention anything about right to education. Hence, this option is beyond the scope of the passage.

35 (b)

Figures (1, 8, 9) → Bisected by a straight line

Figures (2, 3, 5) → Intersected by a straight line

Figures (4, 6, 7) → Extended arm

Hence, option (b) is correct.

36 (d)

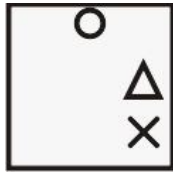
From one figure to the next, only one component moves and the rest stay at the same position.

Components move in the following order:

First \times moves, then the circle, and after that the triangle.

In the fifth figure \times moves one step forward. So, in the sixth figure, circle will move one step forward.

So, the next figure formed will be:



Hence, option (d) is correct.

37 (c)

Frequency: In statistics the frequency (or absolute frequency) of an event is the number of times the event occurred in an experiment or study.

In the given question the number of students who have obtained a certain number of marks will be called as the frequency of that marks.

The count of number of students who have scored 40 marks in the above data is 4. Therefore, the frequency of 40 marks is 4.

Hence, option (c) is correct.

38 (a)

Let weight limit of free luggage allowance be x kg.

A and B have a combined 90 kg of luggage with them, and are charged Rs. 1600 and Rs. 3200 respectively for excess luggage. So, if A has y kg extra luggage, then B must have $2y$ kg extra luggage.

So, A's luggage weight = $(x + y)$ kg

B's luggage weight = $(x + 2y)$ kg

Extra luggage = $y + 2y = 3y$ kg

Rs. 4800 is the charge for $3y$ kg extra luggage.

So, Rs. 6000 will be the charge for $(3y/4800) \times 6000$ i.e. $(15y/4)$ kg extra luggage.

So, $(x + y) + (x + 2y) = x + 15y/4$

Or $x + 3y = 15y/4$

Or $x = 3y/4$

According to the question,

$(x + y) + (x + 2y) = 90$

Or $2x + 3y = 90$

Or $2(3y/4) + 3y = 90$ (since, $x = 3y/4$)

Or $9y = 90 \times 2$

Or $y = 20$ kg

So, $x = 3y/4 = 3 \times 20/4 = 15$ kg

So, B's luggage weight = $x + 2y = 15 + (2 \times 20) = 55$ kg

Hence, option (a) is correct.

39 (d)

In a correct clock, the hands of a clock coincide every $65(5/11)$ minutes.

But in this case, they are together again after every 70 minutes. Hence, the clock is slow and losing time.

Time lost in 70 minutes = $70 - 65(5/11) = 4(6/11) = (50/11)$ minutes

Time lost in one day (24×60 min.) = $24 \times 60 \times [(50/11)/70]$ minutes

Time lost in one week = $7 \times 24 \times 60 \times [(50/11)/70]$ minutes = $(7200/11)$ minutes = $(7200/11)/60$ hours = $10(10/11)$ hours

Thus, the clock loses $10(10/11)$ hours in a week.

Hence, option (d) is correct.

40 (b)

At 9 o'clock, the hour is at 9 and the minutes hand is at 12, i.e., the two hands are 15 min. spaces apart.
The minute hand would have to cover extra 15 spaces in order to be opposite to the hour hand.
55 minutes are gained in 60 min.
15 minutes will be gained in $((60/55) \times 15) = 180/11$ minutes = $16(4/11)$ minutes
The two hands will be in the same straight line but not together at $16(4/11)$ minutes past 9.
Hence, option (b) is correct.

41 (d)

Angle traced by hour hand in 1 hour = $360^\circ/12 = 30^\circ$
Angle traced by hour hand in 7 hours 45 minutes i.e. $(31/4)$ hours = $30^\circ \times (31/4) = 232.5^\circ$
Angle traced by minute hand in 1 minute = $360^\circ/60 = 6^\circ$
Angle traced by minute hand in 45 minutes = $6^\circ \times 45 = 270^\circ$
Therefore, the required difference in angles = $270^\circ - 232.5^\circ = 37.5^\circ$
Hence, option (d) is correct.

42 (c)

Statement 1:

In 12 hours, all 3 hands will coincide 11 times. They will coincide only once between 11 p.m. and 1 a.m.
But in all other instances, they will meet once per hour.

Hence, statement 1 is correct.

Statement 2:

The minute hand and second hand of a clock cross each other 1 time every minute after 6:15. Thus, they will cross each other 26 times.

Hence, statement 2 is correct.

Thus, both statements 1 and 2 are correct.

Hence, option (c) is correct.

43 (d)

Statement 1:

Number of odd days from 1st May to 31st October = $3 + 2 + 3 + 3 + 2 + 3 = 16$.

16 is not divisible by 7.

Hence, statement 1 is not correct.

Statement 2:

Here, 2100 is a century year, and so not a leap year.

So, from 2023 to 2123, there are 24 years in which February has 29 days.

Hence, statement 2 is not correct.

Thus, neither 1 nor 2 is correct.

Hence, option (d) is correct.

44 (d)

When 10^n is divided by 7, the pattern of remainders we get is 3, 2, 6, 4, 5, 1.

Now, we have a power of 100, and remainder $[100/6] = 4$

So, we will get the 4th remainder on the list of 3, 2, 6, 4, 5, 1, when we divide 100^{100} by 7, i.e. a remainder of 4. That is, 4 odd days.

If today is Tuesday, then 100^{100} th day from now will be 4 days after Tuesday, i.e. Saturday.

Hence, option (d) is correct.

45 (b)

23rd June 1757 = (1756 years + Period from 1.1.1757 to 23.6.1757)

Odd days in 1600 years = 0

There are 24 leap years and 76 ordinary years in 100 years.

So, Odd days in 100 years = $(24 \times 2 + 76)/7 = 124/7 = 5$

There are 14 leap years and 42 ordinary years in 56 years.

So, Odd days in 56 years = $(14 \times 2 + 42)/7 = 70/7 = 0$

Now, Number of odd days from 1.1.1757 to 23.6.1757 = $(3 + 0 + 3 + 2 + 3 + 1)/7 = 5$

So, Total number of odd days = $(0 + 5 + 0 + 5)/7 = 3$

Thus, 23rd June 1757 must have been a Monday + 3 = Thursday.

Hence, option (b) is correct.

46 (b)

No two employees get equal number of holidays and each employee gets at least 4 holidays. Therefore, 39 holidays can be distributed among 6 employees as 4, 5, 6, 7, 8 and 9.

Tony gets more holidays than each of Kate and Robin but less than that of John.

John > Tony > (Kate/ Robin)

Emma gets exactly 7 holidays.

Also, John gets one and half times the number of holidays that Robin gets. Thus, the number of holidays of John and Robin may be either (6 and 4) OR (9 and 6).

Case 1: If John = 6 and Robin = 4. We know that Emma gets exactly 7 holidays.

From above: Emma (7) > John (6) > Robin (4)

Now we also know that: John > Tony > (Kate/ Robin)

So, Tony and Kate should also get less holidays than John, i.e. less than 6 holidays. But Robin already have 4 holidays and we can only have one person (either Tony or Kate) having 5 holidays.

Hence, case 1 is not possible.

Case 2: If John = 9 and Robin = 6. Emma gets exactly 7 holidays.

From above: John (9) > Emma (7) > Robin (6)

Since, John > Tony > (Kate/ Robin), Tony gets more holidays than Robin, who gets 6 holidays, but lesser holidays than John who gets 9 holidays. Hence, Tony will have 8 holidays.

From above: John (9) > Tony (8) > Emma (7) > Robin (6)

Now, Kate/Jack = 4 or 5.

Hence, the total number of holidays of Emma and Tony is 15, which is equal to the total number of holidays of John and Robin.

47 (a)

Total number of holidays of Emma, Robin, Kate and Jack = $7 + 6 + 4 + 5 = 22$ (since, sum of the number of holidays of Kate and Jack would be 9 in both possible scenarios)

48 (a)

In 1980, Indian Republic day was celebrated on Saturday. Therefore, 26th January 1980 was Saturday.

Number of odd days from 26th January to 31st January = 5

Number of odd days in:

February (1980 is a leap year, therefore February has 29 days) = 1

March = 3

April = 2

May = 3

June = 2

July = 3

August = 3

September = 5

Number of odd days from 26th January to 5th September = $\{5 + 1 + 3 + 2 + 3 + 2 + 3 + 3 + 5\}/7 = 27/7 = 6$

Subhash was born on 5th September 1980. Therefore, his birthday fell on (Saturday + 6 days) = Friday

Arvind is 5 days younger to Subhash. Therefore, his birthday fell on (Friday + 5 days) = Wednesday

Arunima is 2 days elder to Arvind. Therefore, her birthday fell on (Wednesday - 2 days) = Monday

Arvind and Arunima were born on Wednesday and Monday respectively.

Hence, option (a) is the correct answer.

49 (b)

Assumption 1 is incorrect. Conservation of wildlife has not been discussed in the passage.

Assumption 2 is correct. The problems associated with urbanization are mentioned throughout the passage. This is because of the neglect of the principles of sustainable urbanization. Hence, this assumption is correct as per the passage.

50 (a)

Option (a) is correct. Consider the lines “*Impervious surfaces (e.g., constructed surfaces, roofs, roads, parking lots, driveways, sidewalks) alter the natural hydrological conditions ...*” and “*Moreover, other direct environmental impacts include the degradation of water resources quality when surface runoff transports ...*” These lines show that when the natural hydrological cycle gets disturbed, it affects the quality of water resources. Hence, this is the best crux of the passage.

Option (b) is incorrect. The given option is not correct because deurbanization has not been discussed in the passage.

Option (c) is incorrect. The given option seems to be correct, but this is more of an actionable implication rather than the crux of the passage.

Option (d) is incorrect. The given option is not correct because the use of the phrase “diverse consequences” makes it a generic statement and therefore not specific to the information covered in the passage. Hence, this is not the best crux of the passage.

51 (a)

Inference 1 is correct. The given statement is correct because of the line - “*From an economic standpoint, that poses a risk to long-term food security by creating the potential for a single point failure*”. It shows that due to the possibility of single-point failure, too much dependence on GM crops could be risky for the future. Hence, this inference is correct as per the passage.

Inference 2 is incorrect. The context of high morals is not discussed in the passage. Hence, it is beyond the scope of the passage.

52 (d)

Option (a) is incorrect. The given option is not correct because of the context of the production of seeds in bulk to prevent single-point failure in future. This context is not a part of the passage. The author does mention ‘single point failure’. But, mass production as a solution to this issue is nowhere indicated in the passage.

Option (b) is incorrect. The context of ensuring nutrition for people with malnutrition is not a part of the passage. Hence, this is not the correct statement.

Option (c) is incorrect. The context of monopoly and need for policy is not a part of the passage. Therefore, this statement is not correct.

Option (d) is correct. Refer to the lines: “*Scientists can also engineer pest-resistant crops, helping local farmers better withstand environmental challenges that might otherwise wipe out a whole season of produce. However, GM seeds are produced primarily by only a few large companies that own the intellectual property for genetic variations.*” The various benefits of GM crops will depend on whether the companies producing the seeds fail or not, and how they utilize these crops. Hence, this is the correct statement.

53 (c)

Let x and y be the ten's and unit's digits respectively of the numeral denoting the woman's age.

Then, Woman's age = $(10x + y)$ years

And, Husband's age = $(10y + x)$ years

Therefore, $(10x + y) - (10y + x) = (1/11) (10y + x + 10x + y)$

Or $(9x - 9y) = (1/11) (11y + 11x)$

Or $(9x - 9y) = (x + y)$

Or $8x = 10y$

Or $x = (5/4)y$

Clearly, y should be a single-digit multiple of 4, such that x is also a single-digit.

So, $y = 4$, and $x = 5$

Hence, woman's age = $10x + y = 10 \times 5 + 4 = 54$ years

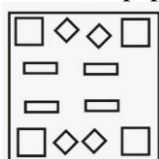
And, Husband's age = $(10y + x) = 45$ years

Sum of the ages of woman and her husband = $54 + 45 = 99$ years

Hence, option (c) is the correct answer.

54 (b)

When the paper is unfolded, it will look as follows:



Hence, option (b) is the correct answer.

55 (b)

Method I:

Let the number of people who visited the amusement park be x .

Now, the number of people (i.e. x) must be a natural number. Also, the number of visitors that visited the pool section (i.e. 20.25% of x) must be a natural number too.

$$20.25\% \text{ of } x = (20.25/100)x = (81/400)x$$

$(81/400)x$ must be an integer, so x must be a multiple of 400.

Hence, the minimum value that x may attain = 400.

Method II:

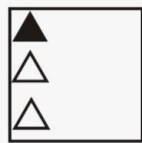
20.25% of x must be a natural number. Hence, 0.25% of x must be a natural number too.

Minimum possible value of x that allows it is $x = 400$. (then 0.25% of 400 = 1, i.e. the least possible natural number)

Hence, option (b) is the correct answer.

56 (c)

Next figure will be:



Hence, option (c) is the correct answer.

57 (d)

It is given that, U has been substituted by 2, i.e. $U = 2$.

The difference between the numerical substitutes for U and Z is 8, i.e. either $U - Z = 8$ or $Z - U = 8$

If $U - Z = 8$, then $Z = U - 8 = 2 - 8 = -6$ (which is not possible)

If $Z - U = 8$, then $Z = U + 8 = 2 + 8 = 10$

The difference between Z and A is 4, i.e. either $A - Z = 4$ or $Z - A = 4$

If $A - Z = 4$, then $A = Z + 4 = 10 + 4 = 14$ (which is not possible)

If $Z - A = 4$, then $A = Z - 4 = 10 - 4 = 6$

Hence, the integer that substituted A is 6.

Hence, option (d) is the correct answer.

58 (c)

Option (a) is incorrect. The given option is not correct because the passage does not mention about the type of stories or how they are told. Hence, this option is not the best crux of the passage.

Option (b) is incorrect. The context of healing capacity is seen in the line “*They are integral to all psychoanalytic theories of therapeutic action, and their telling is therapeutic.*” But, how healing is related to individuals and society is not discussed in the passage. Let’s put this option on hold and consider the next options.

Option (c) is correct. The given option is correct because of the line “*Finally, they can demonstrate how shared stories consolidate group identities, uphold, and perpetuate a group’s power (positives) over others, and perpetuate racial and ethnic stereotypes (negatives).*” These lines validate that in the context of social relations, stories can play a role of a double-edged sword. Hence, this is the best crux of the passage.

Option (d) is incorrect as both options (a) and (b) are incorrect.

59 (c)

Inference 1 is correct. The given inference is correct because of the line “*Electric vehicles (not only cars) are the key technology to decarbonise road transport, a sector that accounts for over 15% of global energy-related emissions.*” It means that electric cars are only a part of a bigger group of electric vehicles, i.e. only a partial solution. Moreover, the issue of carbon emissions is a very wide one. It would require efforts in various sectors, not just in transportation. Hence, the given inference is correct as per the passage.

Inference 2 is correct. The given inference is based on the line “Sales in developing and emerging economies have been slow due to the *relatively high purchase price of an electric vehicle and a lack of charging infrastructure availability*.” These factors clearly validate that presently electric vehicles are not yet a viable replacement for traditional fuel vehicles in many countries. Hence, this inference is correct as per the passage.

60 (d)

The virus will turn from 1 to 2, 2 to 4, 4 to 8 and so on. So, the population of the given virus type, at any given point of time, can be represented as 2^n , where n is a whole number. It's an exponential function which is aptly represented by the curve D.

Hence, option (d) is the correct answer.

61 (d)

Let the time when she left her home be x minutes after 7 p.m.

The speed of the minute hand is 6° per minutes and the speed of the hour hand is 0.5° per minutes.

Initial distance between the hour and the minute hands at 7:00 p.m. is 210° .

So, $(6 - 0.5)x = 210^\circ - 100^\circ$

or $5.5x = 110^\circ$

or $x = 110^\circ / 5.5 = 20$ minutes

Thus, Alisha left home at 07:20 p.m.

Let the time when she came back to her home be y minutes after 7 p.m.

So, $(6 - 0.5)y = 210^\circ + 100^\circ$

or $5.5y = 310^\circ$

or $y = 310^\circ / 5.5 = 56(4/11)$ minutes ≈ 56 minutes 22 seconds

Thus, Alisha returns home at 07:56:22 p.m.

Required time = 07:56:22 p.m. - 07:20 p.m. = 36 minutes

Hence, option (d) is the correct answer.

62 (d)

Statement 1:

At 7 o'clock, the hour hand is at 7.

Angle traced by hour hand in 7 hours = $30^\circ \times 7 = 210^\circ$

The relative speed of the minute hand with respect to hour hand = $6^\circ - (1/2)^\circ = 5.5^\circ$ per minute.

$210 / 5.5 = 38$ minutes 11 sec

Therefore, the time when the hands of the clock will be together = 7:38:11.

Hence, statement 1 is not correct.

Statement 2:

At 7 o'clock, the hour hand is at 7.

The angle between the two hands will be 65° when the minute hand gains $(210^\circ - 65^\circ) = 145^\circ$ or when it gains $(210^\circ + 65^\circ) = 275^\circ$ with respect to hour hand.

The relative speed of the minute hand with respect to the hour hand = $6^\circ - (1/2)^\circ = 5.5^\circ$ per minute.

Thus, the time taken to gain $145^\circ = 145 / 5.5 = 26$ minutes 22 seconds

Thus, the angle between the two hands will be 65° at 7:26:22 o'clock.

Hence, statement 2 is not correct.

Thus, neither 1 nor 2 is correct.

Hence, option (d) is the correct answer.

63 (c)

Let the four parts of the number be A, B, C and D.

According to the question, twice the first part, thrice the second part and four times the third part are equal.

So, $2A = 3B = 4C$

Let $2A = 3B = 4C = k$

or $A = k/2$; $B = k/3$; $C = k/4$

or $A : B : C = 6 : 4 : 3$

or $A : B : C = 30 : 20 : 15 \dots$ (i)

It is also given that six times the second part, eight times the third part and five times the last part are equal.

So, $6B = 8C = 5D$

$$\text{Let } 6B = 8C = 5D = k$$

$$\text{or } B = k/6 ; C = k/8 ; D = k/5$$

$$\text{or } B : C : D = 20 : 15 : 24 \dots (ii)$$

Thus, parts of B and C are same (i.e. 20 and 15) in equations (i) and (ii).

$$\text{Hence, } A : B : C : D = 30 : 20 : 15 : 24$$

$$\text{or } A = 30x, B = 20x, C = 15x, D = 24x$$

Now, let us go through the options one by one.

Option (a): The first part is $30x$ which is divisible by 6. Thus, it is correct.

Option (b): The sum of the third and fourth parts is $39x$ which is divisible by 13. Thus, it is correct too.

Option (c): The third part is $15x$ and is divisible by 4 **only if** the value of x is 4 or multiple of 4. Thus, it is not always going to be true.

Option (d): The product of the last part and any other part {i.e. $(24x \times 30x)$, $(24x \times 20x)$, $(24x \times 15x)$ } is divisible by 5. Thus, it is correct.

Hence, option (c) is the correct answer.

64 (d)

Let the age of the lady = x years

Age of the husband = $x + 3$ years

Age of the daughter = $(x+3)/4$ years

The daughter becomes 15 years old in 3 years. So, the daughter is 12 years old now.

Age of father = 4 times age of the daughter = $12 \times 4 = 48$ years

Age of the mother = 3 years less than the age of the father = 45 years

Sum of the ages of the husband and wife = $48 + 45 = 93$ years

Hence, option (d) is the correct answer.

65 (c)

The same day comes after 400 years.

If 22nd October 2023 is Sunday, then 22nd October 1623 must have been a Sunday too.

Hence, option (c) is the correct answer.

66 (d)

Starting with 2027, count the number of odd days in successive years till the sum is divisible by 7.

Number of odd days from 2027 to 2037 = $1 + 2 + 1 + 1 + 1 + 2 + 1 + 1 + 1 + 2 + 1 = 14$

14 is divisible by 7.

Thus, calendar of 2027 will be similar to that of 2038.

Hence, option (d) is the correct answer.

67 (d)

According to question,

$$\# - \$ + @ \div * = 21$$

We will try substituting the values of #, \$, @ and * by hit and trial method.

By substituting: $\# = 18$; $\$ = 1$; $@ = 16$; $* = 4$ in above equation we get,

$$\# - \$ + @ \div * = 18 - 1 + 16 \div 4 = 17 + 4 = 21$$

Left hand side = Right hand side

Hence, $@ = 16$

Hence, option (d) is the correct answer.

68 (c)

Considering statements 1 and 2 together:

The couple was married before the 13th of February, 1955 on a Sunday.

In the month of February, there was only one Sunday before 13th February, i.e. 6th February 1955.

Hence, both Statement-1 and Statement-2 together are required to answer the Question.

Hence, option (c) is the correct answer.

69 (b)

Number of years from 8th September 2005 to 8th September 2094 = 89 years

There are 22 leap years and 67 ordinary years in 89 years.

Odd days in 89 years = $(22 \times 2 + 67)/7 = 111/7 = 6$

Now, number of odd days from 9th September 2094 to 5th June 2095 = $(1 + 3 + 2 + 3 + 3 + 0 + 3 + 2 + 3 + 5)/7 = 4$

So, Total number of odd days = $(6 + 4)/7 = 3$

Required day = Monday + 3 = Thursday

Thus, the day on 5th June 2095 will be Thursday.

Hence, option (b) is the correct answer.

Explanation for Questions 70 and 71:

R is a Bank employee, staying in Ranchi. Q owns a book shop in Dehradun. P's house is in Shimla, and he is not an Engineer. The teacher, S, lives in Bhubaneswar.

| Name | Occupation | City |
|------|---------------------|-------------|
| S | Teacher | Bhubaneswar |
| R | Bank employee | Ranchi |
| P | Engineer | Shimla |
| Q | Shop owner | Dehradun |
| T | | |

Let's fill in the blanks. The Final arrangement:

| Name | Occupation | City |
|------|---------------|-------------|
| S | Teacher | Bhubaneswar |
| R | Bank employee | Ranchi |
| P | Doctor | Shimla |
| Q | Shop owner | Dehradun |
| T | Engineer | Patna |

70 (c)

Doctor stays in Shimla.

71 (d)

T stays in Patna.

72 (d)

Let present age of Tanya be x years

And present age of her grandfather be y years

According to question,

$$(y - 16) = 8(x - 16)$$

$$\text{Or } 8x - y = 112 \dots(i)$$

$$\text{Also, } (y + 8) = 3(x + 8)$$

$$\text{Or } 3x - y = -16 \dots(ii)$$

On subtracting eqn. (ii) from eqn. (i), we get:

$$(8x - y) - (3x - y) = 112 + 16$$

$$\Rightarrow 5x = 128$$

$$\Rightarrow x = 128/5 = 25.6 \text{ years}$$

$$\text{Now, } y = 3x + 16 = 3 \times 25.6 + 16 = 92.8 \text{ years}$$

$$8 \text{ years ago, ratio of the ages of Tanya and her grandfather} = (25.6 - 8) : (92.8 - 8)$$

$$= 17.6 : 84.8$$

$$= 11 : 53$$

Hence, option (d) is the correct answer.

73 (a)

The original figure is as follows:



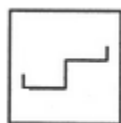
Only option (a) completes the figure as shown below:



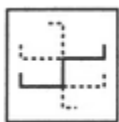
Hence, option (a) is the correct answer.

74 (c)

The original figure is represented below:



On observing the options we can see that the original figure is indeed embedded in the figure given under option (c). It has been represented below:



Hence, option (c) is the correct answer.

75 (b)

The circle moves diagonally upward and downward in each step.

The star moves one step forward in clockwise direction.

The triangle rotates 90 degree clockwise in each step.

So, the missing figure is:



Hence, option (b) is the correct answer.

76 (b)

Option (a) is incorrect. The context of cutting emissions being easy or difficult is not a part of the passage. Also, the passage does not mention anything related to India. Hence, this is not the most rational inference of the passage.

Option (b) is correct. The lines *“Having a plan helps countries understand and orchestrate the many different elements required to reduce emissions and adapt to protect lives and livelihoods, as soon as possible. Every bit of warming matters. With urgent and ambitious action, the world will avoid surpassing a threshold of 1.5 degrees Celsius, after which climate impacts would become even worse than they already are”* signify that the core aim of every country for emission reduction is limiting the temperature rise below 1.5 degree Celsius. Hence, this is the most rational inference of the passage.

Option (c) is incorrect. The context of every country coming to the same platform for NDC implementation is not a part of the passage. Hence, this is not the most rational inference of the passage.

Option (d) is incorrect. The context of poverty alleviation is discussed in the line - *“Nationally Determined Contributions (NDCs) factor in the understanding that countries must balance emissions reductions with other critical demands like ending poverty.”* This is not dependent on controlling emissions. Hence, this is not the most rational inference of the passage.

77 (a)

Option (a) is correct. The given option is correct because of the line “*A behaviour with implications for society puts an even larger responsibility on the individual to act responsibly. ... Any increase in fines (external intervention) for those unlawful driving behaviours that have potential social consequences would have surely received applause from people at large.*” These lines clearly show that an individual's welfare can be translated to society's welfare due to external intervention. Hence, this is what the passage best implies.

Option (b) is incorrect. The given option seems to be correct, but it is very extreme because it cannot be concluded that penalties can solve the issue of road accidents. The passage does not make any such claim.

Option (c) is incorrect. This statement is very generic, and is not based on the information provided in the passage. The context of social acceptance is not a part of the passage. Hence, this is not what the passage implies.

Option (d) is incorrect. The given option is not correct because it is quite vague due to part “any kind”. Also, the passage does not delve into the issue of social harmony.

78 (c)

Option (a) is incorrect. The given option is not correct because the context of “*safe and strong government at the centre*” has not been discussed in the passage. Also, the passage is not India specific.

Option (b) is incorrect. The given option seems to be correct, but it is not because it could be a rational implication but not the crux. Also, the passage does not talk about “*communication in governance*” as such, at least not explicitly.

Option (c) is correct. The given option best captures the essence of the passage as seen in the lines “*Likewise, Internal Security cannot be safeguarded if Governance is delivered by an inefficient and corrupt administration*” and “*For the attainment of these objectives, ... within the parameters of the Constitution and the Rule of Law.*” These lines reflect that internal security is dependent on governance which is based on the Constitution and the Rule of Law. So, this is the best crux of the passage.

Option (d) is incorrect. The passage is not about the importance of the Constitution per se. The main theme is the link between internal security and governance. Hence, this is not the best crux of the passage.

79 (a)

Assumption 1 is correct. The following line “*Less immigration and high unemployment in destination economies would hurt origin countries, especially poorer ones, that rely significantly on the remittances that migrant workers send back home*”, validates the assumption in the statement. Both destination and origin countries would be affected. Hence, as per the passage, this assumption is correct.

Assumption 2 is incorrect. The passage does not throw much light on labour source countries, especially not on the corruption prevailing in those countries. Also, the passage talks about migrants in general, and not just the labour class, which has more of a physical work connotation attached to it. Hence, this assumption is incorrect.

80 (a)

Option (a) is correct. The given option is correct because of the lines “*Less immigration and high unemployment in destination economies would hurt origin countries, especially poorer ones, that rely significantly on the remittances that migrant workers send back home*” and “*World Economic Outlook looks at the economic impact of migration on recipient countries and finds that migration generally improves economic growth and productivity in host countries.*” These lines reflect that both countries benefit from migration, and hence they share a symbiotic relationship. Hence, this is the best crux of the passage.

Option (b) is incorrect. The context of the transfer of culture is not covered in the passage. Therefore, this option is beyond the scope of the passage.

Option (c) is incorrect. The given option is not correct because migration is beneficial for both countries - destinations as well as origin. The lines “*Less immigration and high unemployment in destination economies would hurt origin countries, especially poorer ones, that rely significantly on the remittances that migrant workers send back home*” and “*World Economic Outlook looks at the economic impact of migration on recipient countries and finds that migration generally improves economic growth and productivity in host countries*”, show that migration is beneficial for both. Hence, this is not the best crux of the passage.

Option (d) is incorrect. The given option is not correct because it mentions that origin countries should promote migration so as to get remittances. This option statement could be more of an implication or a fair suggestion, not the crux of the passage.