ANSWERS & EXPLANATION

APTITUDE TEST–Test (4294) – 2024

1 (b)

Distance travelled by the friend on the inner side = $2\pi \times 100$
Distance travelled by the friend on the outer side = $2\pi \times 110$
The outer side friend travels a distance 10% more than his friend. So, his speed is 10% higher.
So, option (b) is the right answer.

2 (b)

Weight of each piece will be H.C.F of all the weights of cakes.
H.C.F {6(1/8), 10(1/2), 8(3/4), 3(15/16)} = H.C.F (49/8, 21/2, 35/4, 63/16) = {H.C.F (49, 21, 35, 63)}/ {L.C.M (8, 2, 4, 16)} = 7/16
∴ The minimum possible number of pieces = (49/8 + 21/2 + 35/4 + 63/16) / (7/16) = (98 + 168 + 140 + 63)/7 = 469/7 = 67
Hence, option (b) is the right answer.

3 (d)

Number of chocolates that Dinesh had = k × [L.C.M (8, 12, 18)] + 5 = 72k + 5 [Here, k is any natural number.]
Since, the number of chocolates he had is less than 200.
So, 72k + 5 < 200
Thus, k = 1 or 2
The number of chocolates that Dinesh had could be 77 or 149.
So, option (d) is correct.

4 (b)

Assumption 1 is correct: The given assumption is correct as it is based on the following lines "*However, water allocation among states often leads to disputes due to variations in water availability and conflicting interests. These disputes frequently necessitate intervention from central authorities to ensure equitable distribution and conflict resolution.*" These lines show that as the states often do not cooperate with each other on water disputes, intervention from central authorities is required.

Assumption 2 is incorrect: The given assumption is not correct because the passage does not focus on agricultural productivity and how resolving water disputes would help in that. The lines "*Efforts to address water stress involve improving water use efficiency in agriculture through modern irrigation techniques, crop selection, and sustainable farming practices*" mention how efforts in agriculture can help with water stress, and not the other way round.

5 (c)

Option (a) is incorrect: The central theme of the passage is water disputes and their resolution in the framework of the constitution involving states' cooperation. However, the given option makes the cooperation of states dependent on the resolution of water stress, which is opposite to the central theme of the passage. So, this is not the best crux of the passage.

Option (b) is incorrect: The passage does not discuss the principle of equitable distribution as important for water dispute resolution. The line "*These disputes frequently necessitate intervention from central authorities to ensure equitable distribution and conflict resolution*" only states that central authorities intervene to ensure equitable distribution in a water dispute. So, this option is not the best crux of the passage as compared to option (c).

Option (c) is correct: The central theme is reflected in the lines "*The Constitution of India, in its Seventh Schedule, **allocates responsibilities for water management between the central government and states***" and "*The **Constitution's framework allows for adaptation to changing conditions**, emphasizing the importance of sustainable water management as India grapples with the challenges of **water stress and agricultural sustainability**.*" These lines show that water dispute resolution is needed for resolving water stress and agricultural sustainability, and it can happen within the framework of the constitution. So, this is the best crux of the passage.

Option (d) is incorrect: The central theme of the passage is water disputes and their resolution in the framework of the constitution involving the states' cooperation. However, the option mentions agricultural productivity as the focus dependent on the state's cooperation for water dispute resolution which is not correct. This option does not capture the central theme and therefore, is not correct.

6 (d)

Inference 1 is incorrect: The given inference is not correct because it states that the environment is capable of guarding itself. However, the passage does not mention such a thing. It mentions "*... **individuals are empowered to become astute consumers and guardians of the environment**"* which means that individuals are consumers as well as guards of the environment.

Inference 2 is incorrect: Refer to the line: "*...and curtailing the use of disposable plastics, collectively serve to diminish our ecological footprint.*" The author talks about diminishing the ecological footprint. From the information given in the passage, we cannot infer whether it can be completely eliminated or not. Also, the term 'Net individual carbon footprint' has not been mentioned in the passage. Therefore, this answer option is beyond the scope of the passage.

7 (c)

Option (a) is incorrect: Though the passage is about individual efforts, it does not compare it with collective efforts in terms of environmental conservation. Also, it would be illogical to say that individual effort is more significant than collective effort, when the former constitutes the latter. So, this option is beyond the scope of the passage and is not correct.

Option (b) is incorrect: From the passage it is amply clear that the author is not against consumption per se. The passage is against irresponsible consumption, and even mentions how astute consumers (not inconspicuous consumers) can become guardians of environment. Therefore, this answer option is incorrect.

Option (c) is correct: The central theme is the importance of individual efforts or lifestyle in the context of consumption and minimizing ecological footprint. The passage mentions "*The way we engage in **consumption, travel, and resource utilization can either exacerbate or ameliorate environmental challenges.***" Also, if the lifestyle is in accordance with the environment, then the health of the planet and individual would be good. This is seen in the line - "*Ultimately, by acknowledging the intricate interplay between environmental dilemmas**, lifestyle choices, and personal health, individuals … positive transformation and contribute to the health of both the planet and the individual**.*"

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

8 (a)

There are 4 steps westward and 5 steps southward.
We know that if there are m horizontal steps and n vertical steps, the number of ways of travelling from one corner to the opposite corner = $^{m+n}C_n$
Here, m = 4, n = 5
So, the number of ways a car can travel from point A to point B = $^{4+5}C_5 = {}^9C_5 = 9!/(4!\times5!) = 126$
Hence, option (a) is the correct answer.

9 (c)

Let the original price be Rs. x per toy.
According to the question,
(1050/x) – [1050/(x + 15)] = 9
Or 1050[x + 15 – x] = 9x(x + 15)
Or 1050×15 = 9x(x + 15)
Or x^2 + 15x – 1750 = 0

We know that x = [-b ±√(b^2 – 4ac)]/2a
So, x = [-15 ± √{15^2 – 4 × 1 × (-1750)}] / 2
Or x = [-15 ± √7225] / 2
Or x = (-15 ± 85) / 2
Or x = 35 or -50
As x > 0, So x = 35
Number of toys purchased by Ananya at original price = 1050/35 = 30
Hence, option (c) is the right answer.

10 (a)

If you have two finite sets A and B, where A has M elements and B has N elements, then A×B has M×N elements.
So, Number of elements in P × Q = 4×4 = 16
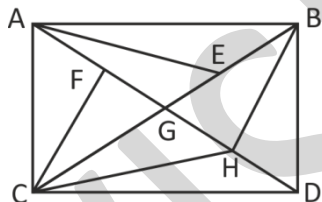Hence, option (a) is the right answer.

11 (a)

There are two vowels in the list.
Number of 4 letter words that can be formed using these letters, such that at least one letter of the word is a vowel = $^7C_4$ ×4! - $^5C_4$ ×4! = 30 × 4! = 720
Hence, option (a) is the right answer.

12 (c)

The triangles in the given figure are: ABD, ACD, AEB, AEG, AGB, BGH, BHD, BGD, BCH, ABC, BCD, ACF, ACG, ACH, CFG, CFH, CFD, CGH, CGD, CHD.
Hence, option (c) is the right answer.

13 (b)

Cost of carpeting = Rs. 1000.
Area of floor = 1000/10 = 100 sq. m
Length of side of the square floor = $\sqrt{area}$ = 10 m.
Therefore, perimeter = 40 m.
So, Area of walls to be painted = 40 × 3 = 120 sq. m.
Cost = 120 × 20 = Rs. 2400
Hence, option (b) is the right answer.

14 (a)

Let the average height of boys and girls be B cm and G cm respectively.
Number of boys in the club = 90
Number of girls in the club = 60

Let average height of the club be A cm.

$A = (90B + 60G)/150$

Or $A = 0.6B + 0.4G$

Now, B lies between 100 and 120 and G lies between 80 and 100.

So, $0.6(100) + 0.4(80) < A < 0.60(120) + 0.4(100)$

Or $92 < A < 112$

Only option (a) includes all these values.

Hence, option (a) is the right answer.

15 (d)

Assumption 1 is incorrect: The given assumption is not correct because the passage does not correlate success or failure in politics with ideological and governance related factors.

Assumption 2 is incorrect: The given assumption is not correct because the myth as stated in the statement is not discussed in the passage. Refer to the lines *"Partisan conflicts and the struggle to maintain ethical standards in a polarized environment can overshadow the noble ideals of public service."* Ethical standards can be maintained, but with difficulty. We cannot say that finding an ethical politician is impossible, and is a myth. It's an extreme statement.

16 (d)

Option (a) is incorrect: The passage talks about the issues and challenges in politics. This statement is very generic in nature and does not fall in line with the subject-matter of the passage.

Option (b) is incorrect: The context of better administrators being better politicians is not mentioned in the passage. Therefore, this option is beyond the scope of the passage and is not the best crux.

Option (c) is incorrect: The given option states that it is important to use money and muscle power to be a successful politician. However, the passage does not imply this. It does talk about the complexities of politics, but nowhere mentions that being successful in politics is impossible without money and muscle power. Therefore, this answer option is incorrect.

Option (d) is correct: The passage mentions various issues related to politics. Consider the lines - "*Successful politicians often combine dedication, effective leadership, and a genuine commitment to the welfare of their constituents to navigate these challenges and contribute positively to the nation's progress.*" It means that with the right set of values politicians can navigate the challenges for the greater good of the people and the nation. So, this option is the best crux of the passage.

17 (c)

Option (a) is incorrect: The passage is about patriarchy and its general issues with respect to values like freedom, equality, etc. The passage does not discuss the constitutional values of any country. So, to state that patriarchy is in contradiction to constitutional values is beyond the scope of the passage.

Option (b) is incorrect: The author is very optimistic about a society that would be just and equitable. It is evident from the lines: *"By dismantling the rigid structures of patriarchy ... we can pave the way for a more just and equitable world."* It would be incorrect to say that a state of freedom and equality for women is a utopian ideal. Therefore, this answer option is incorrect.

Option (c) is correct: The passage clearly states that patriarchy restricts freedom and promotes inequality which hinders the building of an inclusive society. The lines "*By **dismantling the rigid structures of patriarchy** and **fostering an inclusive society that values the autonomy**, worth, and freedom of all its members, we can pave the way for a more just and equitable world, where respect and freedom coexist harmoniously*", show that for building an inclusive society, freedom should come, and restrictions should end which can happen only when patriarchy goes away. So, these concepts are antithetical to each other.

Option (d) is incorrect: The passage does not state that patriarchy is a universal phenomenon. The passage only mentions that it has limited freedom and equality, particularly for women. The central theme of the passage is patriarchy and how it impacts the inclusiveness of society.

18 (d)

Members in the club in the year 2021 = 1040
Members in the club in the year 2023 = 1350

Ratio of men and women in the year 2021 = 6:7
Let the number of men and women in the year 2021 be 6x and 7x respectively.
∴ 6x + 7x = 1040
Or 13x = 1040
Or x = 80
Number of men in the year 2021 = 6×80 = 480

Ratio of men and women in the year 2023 = 7:8
Let the number of men and women in the year 2023 be 7y and 8y respectively.
7y + 8y = 1350
Or 15y = 1350
Or y = 90
Number of women in the year 2023 = 8y = 8×90 = 720

Required ratio = 480:720 = 2:3
Hence, option (d) is the right answer.

19 (d)

Checking option (a):
Ratio of males to females in 2020 = 4:3
Total number of persons in the club in the year 2020 = 1400
4+3 = 7 units = 1400
Or 1 unit = 200
Number of females in the year 2020 = 3×200 = 600

Similarly, Ratio of males to females in 2023 = 7:8
Total number of persons in the club in the year 2023 = 1350
7 + 8 = 15 units = 1350
Or 1 unit = 90
Number of males in the year 2023 = 7×90 = 630
Number of females in the year 2020 is not greater than that of males in 2023.
Therefore, option (a) is **incorrect.**

Checking option (b):
Ratio of males to females in 2022 = 9:7
Total number of persons in the club in the year 2022 = 1280
9 + 7 = 16 units = 1280
Or 1 unit = 80
Difference between males and females in the year 2022 = 9 – 7 = 2 units
Therefore, difference between males and females in the year 2022 = 2 units = 2 × 80 = 160
Therefore, option (b) is **incorrect.**

Thus, none of the given statements is correct.
Hence, option (d) is the correct answer.

20 (c)

Case 1: Compound interest
Principal = Rs. 2000, R_1 = 10%, R_2 = 20%, R_3 = 30%,
Amount = 2000 {1 + (10/100)} {1 + (20/100)} {1 + (30/100)} = 2000×1.1×1.2×1.3 = Rs. 3432
Compound interest = 3432 - 2000 = Rs. 1432

Case 2: Simple interest
Principal = Rs. 2000, R = 20%, Time = 3 years
Simple interest = 2000×20×3/100 = Rs. 1200

The difference of the interests in the two cases = 1432 - 1200 = Rs. 232
Had the sum been lent at 20% p.a., the simple interest realized for 3 years would have been Rs. 232 less.
Hence, option (c) is the right answer.

21 (b)

Downstream speed = speed of boat + speed of current
Downstream speed in the first two hours = 2 + 4 = 6 km/hr
The distance covered in the first two hours = 2×6 = 12 km

But in next 2 hours, the speed of the current doubles.
So, downstream speed in the next two hours = 4 + 4 = 8 km/hr
The distance travelled in those two hours = 2×8 = 16 km
So, in every 4 hours the distance travelled = 12 + 16 = 28 km.

Distance travelled in 16 hours = (28/4) × 16 = 112 km
Distance travelled in the next 2 hours will be 12 km.
Remaining distance to be covered = 130 - (112 + 12) = 6 km
This remaining 6 km distance will be covered at a speed of 8 km/hr.
Time taken to cover 6 km = 6/8 = (3/4) hr

∴ Total time taken to cover 130 km = 16 + 2 + (3/4) = 18(3/4) hours
Hence, option (b) is the right answer.

22 (a)

Let the number of scales, pencils and crayons bought be s, p and c respectively.
Then, c = 2p and p = s + 1
Pencils are thrice as expensive as scales, and scales are sold at half the price of crayons.
So, the cost of a scale, a crayon and a pencil is Rs. 2, Rs. 4 and Rs. 6 respectively.

According to the question,
6p + 2s + 4c = 94
Or 3p + s +2c = 47
Or 3p + s + 4p = 47   (as, c = 2p)
Or 7p + s = 47
Or 7(s + 1) + s = 47   (as, p = s + 1)
Or 8s + 7 = 47
Or 8s = 40
Or s = 5
p = s + 1 = 5 + 1 = 6
c = 2p = 2×6 = 12
So, s + p + c = 5 + 6 + 12 = 23
Thus, she purchased 23 items.
Hence, option (a) is the right answer.

23 (a)

The following four combinations can give a 9: {(6,3), (5,4), (4,5), (3,6)}
Total number of possibilities = 6 × 6 = 36
Required probability = 4/36 = 1/9
Hence, option (a) is the right answer.

24 (c)

Given series: 117649, 16807, 2401, 343, 50, 7
$117649 = (7)^6$
$16807 = (7)^5$
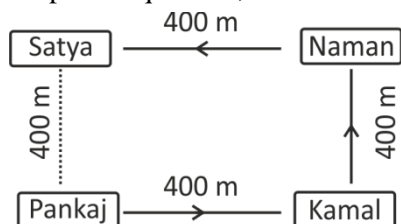$2401 = (7)^4$
$343 = (7)^3$
$49 = (7)^2$
$7 = (7)^1$
Hence, 50 is the wrong term.
So, option (c) is the correct answer.

25 (d)

As per the question, we can draw the following diagram.

From above, it is clear that Kamal lives in the South-East of Satya.
Hence, option (d) is the right answer.

26 (b)

At the start each has ten marbles.

A =10	B= 10	C =10	D=10	E=10	F=10

F borrows 2 marbles from A and gives away 5 to C, who in turn gives 3 to B

A =10-2 =8	B= 10+3=13	C =10+5-3=12	D=10	E=10	F=10+2-5=7

B gives 6 to D, who passes on 1 to E

A =8	B= 13 -6 = 7	C =12	D=10 +6 -1 =15	E=10+1 = 11	F=7

D + E = 26 = B + C + F = 26
So, option (b) is the right answer.

27 (c)

Let 'p' be the present age of Mr. Pandey and a, r, i be the present ages of Ananya, Rudhra and Ishan respectively.
Let 'y' be the present age of Mrs. Pandey.
According to the question,
$2[(a + r + i) - 21] = p - 7$ …..(i)
$2(a + r + i) = p + y$ …..(ii)
Subtracting (i) from (ii), we get:
$42 = y + 7$
Or y = 35 years
So, option (c) is the right answer.

28 (c)

One fifth of the capital depreciates every year. If the initial investment was x, after the first year it will be x − x/5 = x (1 − 1/5) = 4x/5
After second year, capital = $(4x/5) \times (1 − 1/5) = (4/5)^2$ x
Similarly, after fifth year, capital = $(4/5)^5$ x original capital.
Hence, option (c) is the right answer.

29 (a)

Samsung is cheaper than Sony but more expensive than LG. TCL is more expensive than Sony but cheaper than Panasonic.
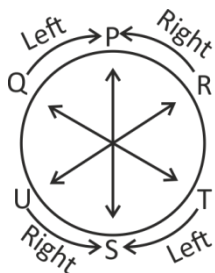We can arrange the prices of televisions from expensive to cheap:
Panasonic > TCL > Sony > Samsung > LG.
Hence, '**Panasonic**' is the most expensive TV and as the cost of TCL is Rs. 17500, the cost of Panasonic can be Rs. 18000.
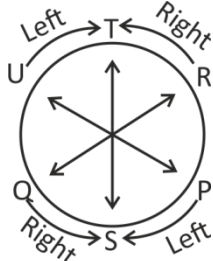Hence, option (a) is the right answer.

30 (a)

We can draw the following diagram based on the information provided in the question.

If T interchanges its position with P and U interchanges its position with Q, then we get:

'U' is in front of 'P' after interchange of positions.
So, option (a) is the right answer.

31 (a)

Inference 1 is correct: The given statement is correct because the main theme is issues in climate change adaptation and different reasons for it. So, to infer that climate adaption is difficult is correct as per the lines "*Firstly, many farmers lack access to modern climate-resilient technologies and practices, often **due to financial constraints**" and "Additionally, **traditional farming methods passed down through generations can be resistant to change**, creating a barrier to adopting climate-smart practices.*" These lines show different constraints in climate adaptation for the farmers. So, this inference is correct.

Inference 2 is incorrect: The passage mentions the different reasons for the poor capacities of farmers for climate adaption. However, it does not mean that farming has become less lucrative; only the adaptation is difficult. Profit aspects of farming have not been discussed in the passage. So, this option is not the correct inference.

32 (c)

Option (a) is incorrect: Considering adaptation to climate change and food security as the responsibility of farmers is not correct, because the main theme of the passage is issues farmers are facing in climate adaptation. The passage is about challenges, not as to who is responsible. So, this option is not the best crux of the passage.

Option (b) is incorrect: The given option mentions poor farmers' climate adaptation which is not correct, because the passage does not categorise farmers into rich and poor. It talks about farmers in general. Also, the use of the word 'only' makes this statement rather extreme.

Option (c) is correct: The passage mentions the different reasons for the poor capacities of farmers for climate adaption and how it is crucial for food security in future. Consider the line - "***The repercussions of farmers' low adaptive capacities** are far-reaching, as **disruptions in agricultural productivity can jeopardize food security**, impacting communities and nations.*" So, future food security is dependent on farmers' adaptation to climate change.

33 (d)

Assumption 1 is incorrect: The passage only mentions how women are affected by anaemia and TB. Consider the lines - "Furthermore, TB is a highly contagious disease that can ***disproportionately affect women***, given their roles in caregiving and the household.*" However, to state that their impact is majorly limited to women is not correct. It's much more extreme a conclusion than what the passage suggests. Also,

there's no mention of old people in this context in the passage. So, this assumption is not correct as far as the passage is concerned.

Assumption 2 is incorrect: This assumption states that more than thirty per cent of the demographic is affected by anaemia and TB. However, this is not the case because the passage only discusses anaemia and TB with respect to women, and does not provide any concrete figures. So, this assumption is not correct and is beyond the scope of the passage.

34 (c)

Option (a) is incorrect: The context of the role of state governments (or even governments in general) and what they should or should not do to address the issue is not a part of the passage. Therefore, this option is beyond the scope of the passage. The central theme of the passage relates to how anaemia and TB affect the socio-economic lives of women. So, this option does not reflect the main idea of the passage.

Option (b) is incorrect: The central theme of the passage relates to how anaemia and TB affect the socio-economic lives of women. The passage does not intrinsically discuss the theme of women-led growth. Also, the central theme is linked to anaemia and TB amongst women, which have not explicitly been mentioned in this statement. This statement just mentions "issue of women health", which is very generic in nature. Therefore, this option does not reflect the main idea of the passage.

Option (c) is correct: The central theme of the passage relates to how anaemia and TB affect the socio-economic lives of women. Consider the lines, "*Anaemia affects a woman's overall health and her ability to be productive in both the household and the workforce. … Furthermore, TB is a highly contagious disease … roles in caregiving and the household. The economic toll of TB is substantial, as it leads to missed workdays and productivity losses*". This shows that addressing anaemia and TB among women is crucial for the economy as well as society. So, this option is correct.

Option (d) is incorrect: The given option is very broad in context, and misses the specific context of anaemia and TB as discussed in the passage. The option, though close, is not the main idea because it misses the context of the societal impact of anaemia and TB on women.

35 (b)

Option (a) is incorrect: The passage is about corruption, issues related to it and possible solutions. The passage does not mention that corruption is normalized in societies as stated in the given option. So, this option is not the best crux of the passage.

Option (b) is correct: The passage is about corruption, its consequences, and remedial measures. The lines "*When individuals in positions of power engage in corrupt practices, they betray the trust (immeasurable) placed in them by the public*" and *"Fostering a culture of transparency, accountability, and ethical behaviour is essential. When morality prevails, public trust is restored, and society can thrive with the confidence that its institutions act in the best interests of all*", state that transparency, morality, etc., are needed to overcome the ill-effects of corruption.

Option (c) is incorrect: The passage mostly discusses about the effects and remedies of corruption, rather than its possible causes. It nowhere mentions or even indicates that ill-informed citizenry is the root cause of a society marred with the evils of corruption.

Option (d) is incorrect as option (a) is incorrect.

36 (d)

Let pipe C can empty the full tank in 'x' min.
Part of the tank emptied by pipe C in one min = (1/40 + 1/60) - (1/48) = (6 + 4 - 5)/240 = 5/240 = 1/48
∴ Pipe C can empty the full tank in 48 min.
Hence, option (d) is the right answer.

37 (c)

Four meaningful words are formed when given letters are arranged. Out of these, three words have been used in preamble of the Indian Constitution.
QEAUYITL = EQUALITY
SUJECIT = JUSTICE
VPRYOTE = POVERTY

RILYTBE = LIBERTY
The word '**POVERTY**' is not in the preamble of the Indian constitution.
So, option (c) is different from the other options.

38 (b)

There are 6 hours between 4:00 am and 10:00 am.
They will overlap six times in 6 hours.
Hence, option (b) is the right answer.

39 (b)

Average profit of merchant A = (3 + 4+ 5+ 3+ 4 + 6) /6 = 25/6 lakhs
Average profit of merchant B = (4 + 4+ 4 + 4 +5 +6)/ 6 = 27/6 lakhs
Clearly, average profit of merchant B is more.
So, option (b) is the right answer.

40 (c)

Given series: 6, 3, 3, 4, ………?
Observing the above series, we get:
Second term: (6+3)/3 = 3
Third term: (3+6)/3 = 3
Fourth term: (3+9)/3 = 4
So, required term = (4+12)/3 = 16/3
Hence, option (c) is the right answer.

41 (c)

Difference between male and female voters in 2003 = 1.97 – 1.71 = 0.26 crore
Difference between male and female voters in 2013 = 2.45 – 2.20 = 0.25 crore
Difference between male and female voters in 2018 = 2.63 – 2.41 = 0.22 crore
Difference between male and female voters in 2023 = 2.87 – 2.71 = 0.16 crore
Thus, in 2003 the difference between male and female voters was the highest.
Hence, option (c) is the right answer.

42 (c)

Sum of the female voters in the years 2003, 2008 and 2023 = 1.71 + 1.71 + 2.71 = 6.13 crore
Sum of the male voters in the years 2018, 1998 and 1993 = 2.63 + 2.32 + 2.07 = 7.02 crore
Required ratio = 6.13/7.02 = 613 : 702
Hence, option (c) is the right answer.

43 (a)

Here, we are adding the value of **odd** position letters and reverse letter value of **even** position letters.

Sum of the alphabetical values of the letters of the word '**ELEPHANT**' = 5 + (27 - 12) + 5 + (27 - 16) + 8 + (27 - 1) + 14 + (27 - 20) = 5 + 15 + 5 + 11 + 8 + 26 + 14 + 7 = 91 → 9 + 1 = 10 → 1 + 0 = 1

Applying a similar pattern for the word '**GOAT**'

Sum of all the digits = 7 + (27 - 15) + 1 + (27 - 20) = 7 + 12 + 1 + 7 =27 →2 + 7 = 9

Similarly, applying a similar pattern for the word '**RAINBOW**'
Sum of all the digits = 18 + (27 - 1) + 9 + (27 - 14) + 2 + (27 - 15) + 23 = 18 + 26 + 9 + 13 + 2 + 12 + 23 = 103 → 1 + 0 + 3 = 4
Hence, option (a) is the right answer.

44 (b)

Let the cost prices of the two computers be Rs.500 and Rs.300 respectively.
∴ $SP_1 = 500 \{1 – (x/100)\}$
and $SP_2 = 300 \{1 + (2x/100)\}$

In the entire transaction, the trader makes a profit of 2.5%.

$SP_1 + SP_2 = 800 + 2.5\%$ of $800 = 820$

Or $500\{1 - (x/100)\} + 300\{1 + (2x/100)\} = 820$

Or $500 - 5x + 300 + 6x = 820$

Or $800 + x = 820$

Or $x = 20$

Hence, option (b) is the right answer.

45 (c)

These are consecutive terms of an AP. Mean of first 5 such numbers will be third such number, which is given to be as 39.

Hence, the series is: 33, 36, 39, 42, 45, 48, 51, 54, 57 and so on.

Now, mean of all the thirteen numbers $= \{[(13-1)/2] + 1\}^{th}$ term $= 7^{th}$ term from the start, i.e. 51.

Hence, option (c) is the right answer.

46 (d)

$\theta = |\,11/2\ m - 30h\,|$,

here, θ = angle, m = minutes and h = hours.

Now, $\theta = 180^o$ (when the two hands of the clock are in the same straight line but not together then the angle between them is 180°), h = 2.

So, $|\,11/2\ m - 30h\,| = 180$

$\Rightarrow |\,11/2\ m - 30\,| = 180$

$\Rightarrow 11/2\ m - 30 \times 2 = \pm180$

$\Rightarrow 11/2\ m = 60 \pm180$

$\Rightarrow 11/2\ m = 240, -120$

Case I: When $11/2\ m = 240$

$\Rightarrow m = 480/11$

Case II: When $11/2\ m = -120$

(Since $-120^0 < 0^o$, so add 360° to -120°)

$\Rightarrow 11/2m = 360 + (-120)$

$\Rightarrow 11/2m = 240$

$\Rightarrow m = 480/11$ (the same we got in Case I)

So, the minute hand and the hour hand will be in the same straight line but not together at 2: 480/11.

Hence, option (d) is the right answer.

47 (c)

From statement 1:

Distance travelled is 200 km and time taken is 6 hours.

Hence, average speed = 200/6 = 33.33 km/hr.

Statement 1 alone is sufficient.

From statement 2:

His onward journey speed is 30 km/hr and his return journey speed is 40 km/hr.

Hence, average speed = $(2\times30\times40)/(30+40) = 34.29$ km/hr.

Statement 2 alone is also sufficient.

Hence, option (c) is the right answer.

48 (a)

$5400 = 2^3\times3^3\times5^2$; $9000 = 2^3\times3^2\times5^3$

HCF of 5400 and 9000 $= 2^3\times3^2\times5^2$

Number of factors of 5400 = (3+1) (3+1) (2+1) = 4×4×3 = 48.

[Total number of factors of $a^x\times b^y\times c^z$ = (x+1) (y+1) (z+1).

Here a, b and c should be prime numbers]

Similarly, number of factors of 9000 = (3+1) (2+1) (3+1) = 4×3×4 = 48.

Number of factors of HCF of the two numbers = (3+1) (2+1) (2+1) = 4×3×3 = 36.

Hence, the required number of divisors = (48 + 48) - 2× 36 = 96 – 72 = 24.

Hence, option (a) is the right answer.

49 (a)

Option (a) is correct: The central theme of the passage is food systems and their impact on health, and the economy. Consider the lines - *"A transformation of **food systems is not only a matter of public health but also an economic imperative**. Investing in more diverse, nutritious, and sustainable food production, distribution, and consumption can **lead to healthier populations, reduced healthcare costs**, and increased labour productivity, which **collectively contribute to economic growth and resilience."** Hence, if the food system is good, it will keep the society healthy, which in turn will contribute to the economy, making it prosperous. So, this is the most critical inference from the passage.

Option (b) is incorrect: The central theme of the passage is food systems and their impact on health, and the economy. The focus is on how food (and health) can help reap the demographic dividend in society. So, we cannot say that demographic dividend can be reaped even without prioritising health and nutrition. Therefore, this answer option is incorrect.

Option (c) is incorrect: The passage does not discuss health policy and whether food-based nutrition is missing from it, that too globally. The central theme of the passage is food systems and their impact on health and the economy. So, this option is beyond the scope of the passage and is not correct.

Option (d) is incorrect: The given option seems to be correct, but it is not, because the passage is not limited to any country. It is not talking about India per se. So, to state that India faces a double whammy would not be correct.

50 (c)

Note: *This question is about invalid assumptions.*

Assumption 1 is incorrect: The passage does not compare the performances of pragmatists and idealists in handling failure. Therefore, this assumption is beyond the scope of the passage.

Assumption 2 is correct: The given assumption is based on the lines "*While **idealism can inspire** and set aspirational goals, **pragmatism often provides the practical means** to achieve them."* This line indicates that idealism and pragmatism, both are useful. Hence, this assumption is correct as per the passage.

Assumption 3 is incorrect: The first line of the passage specifically mentions that idealism and pragmatism represent contrasting philosophical approaches that influence how individuals perceive and approach the world. This does not mean that these two are the only philosophical approaches the world has currently. It is possible that there are other approaches too. Therefore, this is an incorrect assumption.

51 (d)

Inference 1 is incorrect: The author only says that dictatorships may promise stability, but it often comes at the cost of human rights and social development. This does not mean that democracies are less stable than dictatorships. It is just a possibility that under certain situations, dictatorships may appear stable as dissents are suppressed. Also, the author does not say whether one political system is better than the other when it comes to long term growth. Therefore, this answer option is incorrect.

Inference 2 is incorrect: The given inference is not correct because the rule of law is a feature of democracy, as evident from the lines "*It (democracy) promotes individual rights, freedoms, and **the rule of law**, with mechanisms for checks and balances.*" Nowhere has the author indicated that in democracies rules are easily bent and broken. The author is optimistic for democracies, not critical or pessimistic.

52 (a)

$6 = 2 \times 3$; $7 = 7$; $8 = 2^3$; $9 = 3^2$; $10 = 2 \times 5$
So, LCM $= 2^3 \times 3^2 \times 5 \times 7 = 2520$.
So, the bells are tolling together every 2520 seconds.
Now,
2 hours $= 2 \times 3600$ seconds
$= 7200$ seconds
$= 2 \times 2520 + 2160$
So, in 2 hours (7200 seconds), all the five bells will toll together twice (ignoring the tolling at t=0).
Hence, option (a) is the right answer.

53 (c)

Let o, t, f denote the number of toys of one rupee, three rupees and five rupees respectively.
Then according to the question,
o + 3t + 5f = 200 …. (i)
o = 8t … (ii)
From equations (i) and (ii), we get:
(8t + 3t) + 5f = 200
Or 11t + 5f = 200
Clearly, t must be a multiple of 5.
Number of three-rupees toys is more than 10. So, t > 10.
Thus, values of t can be 15, 20, …..
But t = 20 is not possible as 11 × (20) = 220 >200
Thus t = 15, o = 8t = 8×15 = 120
f = (200 – 11t)/5 = (200 – 11×15)/5 = 7
Thus, there are 15 + 7 + 120 = 142 toys in all.
Hence, option (c) is the right answer.

54 (b)

Arvind's one day work = 1/10
Ajay's one day work = 1/20
Rudra's one day work = 1/40
Portion of work done by Arvind, Ajay and Rudra on the first day = (1/10) + (1/20) + (1/40) = 7/40
Portion of work done by Arvind on second day = 1/10
∴ Portion of work done every two days = (1/10) + (7/40) = 11/40

Portion of work completed in 6 days = 3 × (11/40) = 33/40
On the seventh day, all of them will work and finish the remaining 1 – (33/40) = 7/40 of the work.
Thus, the work will get completed in 7 days.
Hence, option (b) is the right answer.

55 (c)

Cost price of cheaper variety = Rs. 24/kg
Cost price of dearer variety = Rs. 38/kg
Cost price of mixture = 40 × 100 / {100 + 11(1/9)} = 40 × 100 × 9/1000 = Rs. 36 per kg
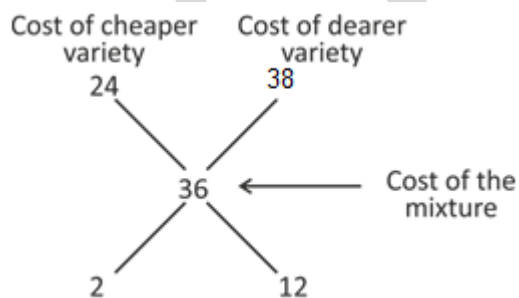
∴ The required ratio = (38 – 36) : (36 – 24) = 2 : 12 = 1 : 6
Hence, option (c) is the right answer.

56 (d)

$72 = 2^3 \times 3^2$; $90 = 2 \times 3^2 \times 5$
So, HCF = $2 \times 3^2 = 18$.
So, the dimension of the equal sized tiles will be 18m×18m (square).
So, the required number of tiles $= \frac{72m \times 90m}{18m \times 18m} = 20$.
Hence, option (d) is the right answer.

Explanation for Questions 57 to 59:

Five persons sit between M and S. R sits 3rd to the right of S. J sits 2nd to the left of M.

Case 1: J - M - - - - - S - - R

Case 2: S - - R J - M

P is the only neighbor of J. So, Case 2 can be eliminated, and we get:

J P M - - - - - S - - R

Now, T sits fourth to the right of P. D sits fifth to the right of T. G sits 3rd to the left of D. One person sits between G and Q. So, we get:

J P M - - T - G S Q D R

Number of persons sitting to the left of T is three less than the number of persons sitting to the right of D. So, the final arrangement will be:

J P M - - T - G S Q D R - - - - - - -

57 (c)

58 (a)

59 (d)

60 (b)

Total Trade = Imports + Exports

⇒ Imports = Total Trade – Exports

Given,

Country	Total Trade
China	76
United States	66
United Arab Emirates	56
Saudi Arabia	42

and

Country	Exports
China	9
United States	40
United Arab Emirates	30
Saudi Arabia	6

So,

Country	Imports
China	67
United States	26
United Arab Emirates	26
Saudi Arabia	36

Since, Trade Balance = Exports – Imports

So,

Country	Trade Balance
China	-58
United States	14
United Arab Emirates	4
Saudi Arabia	-30

So, there are 2 (two) countries, the United States and United Arab Emirates, with which India has positive Trade Balance.

61 (d)

India's total trade (in billions of US dollars) with all the given countries = 76+66+56+42 = 240

Now,

∵ 240 billion US Dollars = 360°

∴ 1 billion US Dollars = (360/240)°
∴ x billion US Dollars = (360/240×x)° = (3/2 x)° = (1.5x)°.

Explanation for Questions 62 & 63:

U lives on an odd numbered floor, but above the third floor. So, U can be either at 5th or at 7th floor.
Only two persons live between T and V. The number of persons living between U and V is one less than the number of persons living between V and T.

Floor	Person (Case 1)	Person (Case 2)	Person (Case 3)	Person (Case 4)
8			T	
7		V	U	U
6	T			
5	U	U	V	V
4		T		
3	V			
2				T
1				

S lives three floors above P, who lives immediately below T. So cases 1 and 3 can be eliminated.

Floor	Person (Case 2)	Person (Case 4)
8		
7	V	U
6	S	
5	U	V
4	T	S
3	P	
2		T
1		P

R lives below Q and above W. So, we get:

Floor	Person (Case 2)	Person (Case 4)
8	Q	Q
7	V	U
6	S	R
5	U	V
4	T	S
3	P	W
2	R	T
1	W	P

As many persons live between R and W as the number of persons living above R. So, case 2 can be eliminated.

Floor	Person (Case 4)
8	Q
7	U
6	R
5	V
4	S
3	W
2	T
1	P

62 (d)

63 (d)

64 (b)

Option (a) is incorrect: The author does not advocate for ending charity in the long run. The line "*...concerted effort to **address systemic disparities and provide opportunities** for all, **ultimately reducing the need for charity** in the long run*" only means that in the long run, the need itself will reduce. There is no need for concerted efforts to end it.

Option (b) is correct: The given option captures the essence of the passage, which is that charity is only a temporary solution to the problem of inequality. This is based on the line, "***While charity plays a vital role in alleviating the immediate suffering** of those in need, it's essentially a temporary solution to systemic issues like income disparities, access to education, and healthcare.*" Hence, this is the best option.

Option (c) is incorrect: The given option is not correct as per the line - "*Charity, while admirable, can sometimes **perpetuate the status quo** by not addressing the root causes of inequality.*" This line means that charity may not change the status of inequality in society. This does not mean that charity increases inequality.

Option (d) is incorrect: The passage is about charity and inequality, showing how charity alone cannot solve the issue of inequality. However, the given option states that inequality is a natural phenomenon, which is not correct, as the passage does not mention so.

65 (c)

Assumption 1 is incorrect: The given assumption is based on the lines "*These two components often come into conflict, **leading to internal struggles**.*" They are often in a state of conflict. That means, they can exist, though rarely, in a non-conflict state also. So, this option is not correct.

Assumption 2 is incorrect: Superego is just a construct of the psychoanalytic theory given by Sigmund Freud. The passage does not clarify whether its presence has been scientifically proven or not.

66 (b)

Option (a) is incorrect: The passage is not about humans being social animals, and how the superego helps in understanding that. So, this option is beyond the scope of the passage and is not correct.

Option (b) is correct: The given option is based on the following lines "*Introduced by Sigmund Freud in his **psychoanalytic theory, the superego represents the moral and ethical dimension** of an individual's psyche … The **complexities of the superego** are rooted in the delicate balance it strikes between upholding moral principles and avoiding excessive rigidity or self-criticism.*" These lines reflect that the superego is a complex and intricate concept related to human personality. How the superego plays a role in humans' lives is explained in the passage. So, this is the most rational inference.

Option (c) is incorrect: The given option seems to be based on the following lines "T*he superego acts as an **internalized moral compass**, guiding one's behaviour and decisions in line with societal and personal standards. The complexities of the superego are rooted in the **delicate balance** it strikes between upholding*

moral principles and avoiding excessive rigidity or self-criticism." However, these lines nowhere relate success with one's superego. The role of the superego in success is not discussed in the passage, and hence, this option is not the most rational inference of the passage.

Option (d) is incorrect: As per the passage, the superego is a psychological concept. It means that everyone has a superego. However, to state that anti-social people lack superego because of self-criticism would not be correct, because the passage does not state so. Therefore, this option is not the most rational inference of the passage.

67 (c)

Assumption 1 is correct: The given assumption is based on the lines - "*On one hand, investing in advanced technologies and sustainable practices can be expensive, impacting short-term profitability. However, the cost of inaction is even steeper*" and "*The rational choice for businesses is to recognize the urgency of mitigating emissions through climate tech, not only as a matter of social and environmental responsibility but also as a means of protecting themselves in the long run.*" These lines mean that fighting climate change needs investment in technologies and sustainable practices despite being expensive. Also, mitigating emissions is necessary for their own survival. So, without investing in technology, a company's survival may become uncertain, especially in the long run. Hence, this assumption is correct as per the passage.

Assumption 2 is correct: The given assumption is based on the lines "*Many companies are grappling with the trade-off between implementing costly emission reduction strategies and suffering the long-term consequences of climate change.*" These lines mean that the cost of emission reduction is high today, but if we don't invest in these then the future would be uncertain due to health risks, property damage, displacement of communities, etc. So, it is correct to assume that the cost incurred today is an investment for sustainable tomorrow.

68 (d)

In expression $(a^n + b^n)/ (a + b)$, Remainder = 0, if n is odd.
[i.e. $(a^n + b^n)$ is divisible by $(a + b)$ if n is an odd number].
So, $(2^{2001} + 1)$ and $(2^{2003} + 1)$ both are divisible by $(2 + 1)$, i.e. 3.
Now, $2^{2002} + 1 = (2^2)^{1001} + 1 = 4^{1001} + 1$, which is divisible by $(4 + 1)$, i.e. 5.
Hence, none of the given numbers is a prime number.
Hence, option (d) is the right answer.

69 (b)

Radius of drum = 7/2 = 3.5 m
Radius of each marble = 1.4/2 = 0.7 m
Rise in water level = 11.4 – 3 = 8.4 m
Volume of the water displaced by N marbles = (base area) × (rise in water level)
∴ N $\{(4\pi (0.7)^3)/3\} = \pi (3.5)^2 × 8.4$
Or N = $[(3.5)^2 × 8.4 × 3] / [4 × (0.7)^3]$
Or N = 225
Hence, option (b) is the right answer.

70 (d)

According to the question,
$S_4 = t_1+t_2+t_3+t_4 = 6$ (i)
$S_6 = t_1+t_2+t_3+t_4+t_5+t_6 = 4$ (ii)
From equations (ii) and (i), we get:
Eqn(ii) – Eqn(i) = $t_5+t_6 = -2$
Now, 5th term of AP = a+4d and 6th term = a+5d
So, a + 4d + a + 5d = -2
Or 2a + 9d = - 2
Sum of 10 terms, $S_{10} = (10/2) \{2a + 9d\}$
 = (10/2) x (-2)
 = -10
Hence, option (d) is the right answer.

71 (d)

Runs scored between 16 to 25 overs = 12+3+7+10+12+12+3+5+3+7 = 74
Runs scored between 6 to 15 overs = 7+7+8+2+5+4+6+4+2+2 = 47
Required ratio = 74/47 = 74 : 47
Hence, option (d) is the correct answer.

72 (c)

Runs scored by players between 11 to 15 overs = 4+6+4+2+2 = 18
runs scored by players between 26 to 30 overs = 12+2+9+7+1 = 31
Required percentage = [(31-18)/31]×100 = [13/31]×100 = 1300/31 = 41.9%
Hence, option (c) is the correct answer.

73 (a)

HCF of $(a^m - 1)$ and $(a^n - 1) = a^{HCF \, of \, (m, \, n)} - 1$.
So, the required HCF = $2^{HCF \, of \, (284, \, 248)} - 1$
[$284 = 2^2 \times 71$ and $248 = 2^3 \times 31$.
So, HCF (284, 248) = $2^2 = 4$]
= $2^4 - 1 = 16 - 1 = 15$.
Hence, option (a) is the right answer.

74 (c)

Option (a) is incorrect: The given option focuses on the mutuality of empathy. However, the central theme is the paradox of empathy, and what needs to be done to solve it for a balanced life. The central theme is not the two-way nature of empathy. Hence, this option is not a logical inference.

Option (b) is incorrect: This option is about balancing empathy with efforts. However, the passage is about balancing empathy for others and the resultant burden or exhaustion on us. Also, the tone of the passage is suggestive, rather than pessimistic, as this option statement sounds.

Option (c) is correct: The passage is on empathy and the related paradox of creating an imbalance in life as seen in the lines "*It's a reminder that **self-care and emotional boundaries are essential**, allowing us to navigate the complexities of empathy without being overwhelmed by its weight.*" So, this option reflects the power of empathy, along with the context of balancing it due to its negative impacts on the self. So, this option is the most logical inference of the passage.

Option (d) is incorrect: The passage simply mentions that having empathy has some issue which is presented as a paradox, but whether everyone faces it or not cannot be inferred from the passage. Also, the passage nowhere indicates that everyone having empathy has an unbalanced personal life. So, this option is not correct.

75 (a)

Option (a) is correct: The passage is about the dichotomy of interests of stakeholders and shareholders and the possible solution to it as seen in the lines "***Shareholders** often focus on **maximizing profits** and share value, while **stakeholders** ... may **prioritize ethical and sustainable practices**. ... Achieving this equilibrium, ... **with corporate governance mechanisms** serving as a critical tool to navigate this dichotomy effectively.*" These lines indicate that with good governance the dichotomy can be resolved. Hence, this option is the best crux of the passage.

Option (b) is incorrect: The passage is not about how to make profits; it is about balancing varying interests of shareholders and stakeholders. This option statement misses the context of stakeholders like employees and environment. Also, shareholders will naturally benefit with profit maximization. So, the statement is also logically flawed. Hence, this option does not cover the central theme of the passage and is not correct.

Option (c) is incorrect: The context of companies working against the interest of shareholders and stakeholders is not covered in the passage. The role of governments has not been highlighted either. The

passage is about balancing the interests of shareholders and stakeholders as stated in option (a). Hence, this option is not the best crux of the passage.

Option (d) is incorrect: The given option is not correct because it mentions the absence of ethical and sustainable practices in corporate governance. This has not been mentioned in the passage. Also, the given option misses the central theme, which is the dichotomy of interests of shareholders and stakeholders. Hence, this option is not the best crux of the passage.

76 (c)

Assumption 1 is incorrect: The given assumption is not correct because the context of IC engines and its impact on EV sales is not covered in the passage. Therefore, this option is not the correct assumption as per the passage.

Assumption 2 is incorrect: As per the option, the government should find alternate options for EVs for a sustainable transportation future. However, the whole passage is on EVs and their high cost as a barrier to mass adoption. So, this assumption is hypothetical and not based on the information provided in the passage.

Assumption 3 is correct: The given assumption is based on the following lines "*Advances in battery technology are **crucial for reducing manufacturing expenses**, while economies of scale can further bring down costs*". This means that if R&D happens in batteries, that can reduce the cost of manufacturing. So, it is correct to assume that there is a scope of R&D in EVs.

77 (c)

Inference 1 is incorrect: The passage nowhere compares the demand for organic products in domestic and export markets. It only says that due to its chemical free nature and appeal to health-conscious consumers, it has a lucrative international market. Therefore, this inference is beyond the scope of the passage.

Inference 2 is incorrect: The line "*Additionally, the limited availability and cost of organic fertilizers can make organic farming less economically viable for some farmers*" clearly shows that organic farming is not viable for some farmers due to its high costs. However, this statement mentions that it is feasible for all stakeholders, which is not correct as per the passage.

78 (a)

Note: The question is about invalid assumptions.

Assumption 1 is incorrect: The given assumption is based on the following line - "*Furthermore, emerging innovations, like **AI-driven sorting robots** and advanced recycling equipment, streamline the recycling process, making it more efficient and cost-effective.*" The sorting bots may replace manual segregators, but it is possible that the overall increase in efficiency creates new job opportunities. So, we cannot conclusively say that job losses will ensue.

Assumption 2 is correct: The passage mentions that advanced waste-to-energy technologies, such as incineration and anaerobic digestion, are used to convert non-recyclable waste into clean energy. This implies that certain types of waste, which are not suitable for traditional recycling methods, can indeed be processed using these technologies. However, it is also implied that not all wastes are suitable for conversion into energy. Consider the lines – "*These methods convert non-recyclable waste into clean energy, **reducing the volume of landfill-bound trash** and curbing harmful emissions.*" and "*These technologies help us maximise the reuse of valuable materials while **minimising waste (not eliminate)**.*" Therefore, this assumption is somewhat supported by the passage.

79 (c)

Option (a) is incorrect: The passage is not about the efficiency of the waste-to-energy technologies and the causes behind it. The central theme of the passage is the importance of segregation and waste-to-energy technologies for waste management. So, this option does not reflect the most rational inference.

Option (b) is incorrect: The option mentions that incineration and anaerobic digestion energy are inexpensive while this is not mentioned in the passage. The passage does not mention whether these technologies are inexpensive due to huge waste availability. It only mentions "*Technologies like incineration and anaerobic digestion can transform organic waste into biogas or heat energy.*" These lines just reflect the usage of these technologies. So, this option does not reflect the most rational inference.

Option (c) is correct: The passage focuses on segregation at the start and waste-to-energy technologies in the later part. The segregation part is seen in the lines "***The process begins with effective waste segregation,*** *where households and industries separate materials like plastics, paper, and metals*. *This separation enables more efficient recycling processes*" and the importance of waste-to-energy technologies in the lines "***Advanced waste-to-energy technologies have emerged as a significant component of sustainable waste management.***" So, this option captures the essence of the passage - segregation and waste-to-energy technologies are crucial for effective waste management.

Option (d) is incorrect: The given option statement is contrary to the information provided in the passage.

80 (b)

The first day of the calendar was Monday.

In 100 years, odd days = 5. So, last day of first 100 years will be Friday.

In 200 years, odd days = 3. So, last day of first 200 years will be Wednesday.

In 300 years, odd days = 1. So, last day of first 300 years will be Monday.

In 400 years, odd days = 0. So, last day of first 400 years will be Sunday.

The above cycle will repeat thereon.

So, the last day of century years may only be from amongst Friday, Wednesday, Monday and Sunday.

Hence, option (b) is the right answer.