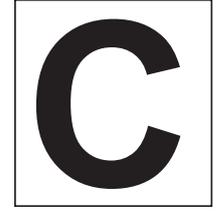


Test Code

03031526



Test Booklet Series



परीक्षण पुस्तिका अनुक्रम

अनुभव-2026

# ALL INDIA OPEN MOCK TEST

GENERAL STUDIES PAPER-II

(15<sup>th</sup> March, 2026)

*Answer Key*

1. (c)	17. (c)	33. (b)	49. (d)	65. (b)
2. (d)	18. (b)	34. (c)	50. (a)	66. (a)
3. (b)	19. (c)	35. (c)	51. (a)	67. (b)
4. (c)	20. (b)	36. (a)	52. (b)	68. (b)
5. (d)	21. (c)	37. (b)	53. (a)	69. (d)
6. (b)	22. (c)	38. (b)	54. (c)	70. (b)
7. (d)	23. (d)	39. (a)	55. (b)	71. (a)
8. (b)	24. (c)	40. (a)	56. (c)	72. (a)
9. (b)	25. (a)	41. (d)	57. (a)	73. (d)
10. (a)	26. (b)	42. (c)	58. (b)	74. (b)
11. (c)	27. (a)	43. (c)	59. (c)	75. (b)
12. (a)	28. (d)	44. (c)	60. (b)	76. (b)
13. (b)	29. (d)	45. (b)	61. (b)	77. (b)
14. (a)	30. (b)	46. (a)	62. (b)	78. (c)
15. (b)	31. (a)	47. (b)	63. (c)	79. (d)
16. (b)	32. (c)	48. (b)	64. (c)	80. (c)

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1. (c)

- **(a) is incorrect because** it shows carbon taxes are effective in reducing emissions, which weakens the critics' argument.
- **(b) is incorrect because** redistribution to low-income households reduces the burden concern raised by critics.
- **(c) is correct because** buying permits while increasing production supports the claim that pollution is commodified without structural change.
- **(d) is incorrect because** falling renewable costs do not address the criticism about commodification of pollution.

2. (d)

- **(a) is incorrect because** the passage emphasizes the role of public investment and policy support, not market forces alone.
- **(b) is incorrect because** the passage does not say technological progress is highly unlikely without policy, only that policy accelerates and shapes it.
- **(c) is incorrect because** the passage highlights economic benefits like competitiveness and employment generation.
- **(d) is correct because** the passage concludes that the pace and sequencing of policy intervention influence the success of sustainable transitions.

3. (b)

- **(a) is incorrect because** the passage supports national coordination along with decentralization, not minimal central oversight.
- **(b) is correct because** the passage clearly advocates region-specific strategies combined with national coordination.
- **(c) is incorrect because** the passage explicitly rejects a uniform national template.
- **(d) is incorrect because** the passage discusses multiple regional challenges, not only urban demand as the primary driver.

4. (c)

- **I is valid because** the passage argues that diverse regional ecological conditions require localized and differential policy approaches.
- **II is valid because** the passage implies that national coordination alone is insufficient without region-specific implementation strategies.

5. (d)

Any number of the form  $p^a q^b r^c$  will have  $(a + 1)(b + 1)(c + 1)$  factors, where  $p, q, r$  are prime. (This is a very important idea)

For any number  $N$  of the form  $p^a q^b r^c$ , the sum of the factors will be  $(1 + p^1 + p^2 + p^3 + \dots + p^a)(1 + q^1 + q^2 + q^3 + \dots + q^b)(1 + r^1 + r^2 + r^3 + \dots + r^c)$ .

Sum of factors of number  $N$  is 124. 124 can be factorized as  $2^2 * 31$ . It can be written as  $4 * 31$ , or  $2 * 62$  or  $1 * 124$ .

2 cannot be written as  $(1 + p^1 + p^2 + p^3 + \dots + p^a)$  for any value of  $p$ .

4 can be written as  $(1 + 3)$

So, we need to see if 31 can be written in that form.

The interesting bit here is that 31 can be written in two different ways.

$$31 = (1 + 2^1 + 2^2 + 2^3 + 2^4)$$

$$31 = (1 + 5 + 5^2)$$

Or, the number  $N$  can be  $3 * 2^4$  or  $3 * 5^2$ .  
Or  $N$  can be 48 or 75.

The question is “**What is the number?**”

**Hence the answer is “More than one such number exists”**

Choice D is the correct answer.

6. (b)

Let us  $x = ha; y = hb$

$a$  and  $b$  are co-prime. So, LCM of  $(x, y) = h * a * b$

So, in essence  $h + h * a * b = 91$ . Or  $h(ab + 1) = 91$

Now, 91 can be written as  $1 * 91$  or  $7 * 13$

Or, we can have HCF as 1, LCM as 90 -

There are 4 pairs of numbers like this (2, 45), (9, 10), (1, 90) and (5, 18)

We can have HCF as 7,  $ab + 1 = 13 \Rightarrow ab = 12 \Rightarrow 1 * 12$  or  $4 * 3$

Or, the pairs of numbers are (7, 84) or (21, 28)

The third option is when HCF = 13,  $ab + 1 = 7 \Rightarrow ab = 6$

Or (a, b) can be either (1, 6) or (2, 3)

The pairs possible are (13, 78) and (26, 39)

There are totally 8 options possible - (2, 45), (9, 10), (1, 90), (5, 18), (7, 84), (21, 28), (13, 78) and (26, 39).

8 Pairs.

The question is “How many pairs of positive integers x, y exist such that  $HCF(x, y) + LCM(x, y) = 91$ ?”

Hence the answer is “8 pairs”

Choice B is the correct answer.

7. (d)

(1) **m is the product of 2 and some other integer.**

So:

$m=2k$ , for some integer k

This means **m is an even integer.**

But **n could be anything.**

Examples:

- $m = 6, n = 3 \rightarrow 6/3=2$  (integer)
- $m = 6, n = 4 \rightarrow 6/4=1.5$ (not integer)

So we **cannot determine** whether  $m/n$  is an integer.

**Statement (1) is NOT sufficient**

**Statement 2:** Tells us that n is prime or 1 – insufficient

Even after combining both, (1)+(2) If  $x=2$  and  $y=2=\text{prime}$   $x/y=1=\text{integer}$  but if  $x=2$  and  $y=3=\text{prime}$  then  $x/y=1/3 \neq \text{integer}$ . Not sufficient.

Hence, the Question cannot be answered using both statements together

8. (b)

(1) The sum of the areas of the faces of the cube is 24. A cube has 6 faces and the area of each is  $a^2$ , where a is the length of a side. Thus we have that  $6a^2=24 \Rightarrow a=2 \rightarrow \text{volume}=a^3=8$ . Sufficient.

(2) The greatest possible distance between two points on the cube is  $5\sqrt{3}$ . This implies that the diagonal of the cube is  $5\sqrt{3} \rightarrow \text{diagonal} = a^2 + a^2 + a^2 = (5\sqrt{3})^2 \rightarrow a = 5$ , hence volume =  $a^3 = 125$ . Sufficient

Hence, Question can be answered using either of the statements alone.

9. (b)

Let original rectangle have:

- Length = L
- Width = W (with  $L > W$ )

Width increased by 10%  $\Rightarrow$  new width =  $1.1W$

Perimeter

Original perimeter =  $2(L+W)$

New perimeter =  $2(L+1.1W) = 2L+2.2W$

Increase =  $0.2W$

Percentage increase =  $0.2W/2(L+W) \Rightarrow$  This depends on L and W, not always 10%.

**Area**

Original area =  $LW$

New area =  $L \times 1.1W = 1.1LW$ , So area increases by **10%** — always true.

**Diagonal**

Original diagonal =  $\sqrt{L^2+W^2}$

New diagonal =  $\sqrt{L^2+(1.1W)^2}$

Not a fixed 10% increase — depends on the ratio  $L/W$ .

10. (a)

(1) **C is the grandmother of D.**

C is mother of B, and B is parent of D  $\rightarrow$  grandmother.

True

(2) **A is the uncle of D and E.**

A is brother of B, and D & E are B’s children  $\rightarrow$  uncle.

True

(3) **C has only one son.**

We know A is a son. B’s gender is not given — B could be male or female.

False

(4) **B has only one daughter.**

D is daughter and E is sister of D  $\rightarrow$  E is also daughter.

False

11. (c)

- (a) is incorrect because the passage does not dismiss unemployment but argues that vulnerability goes beyond it.
- (b) is incorrect because the passage supports welfare programmes as addressing broader vulnerability.
- (c) is correct because the passage emphasizes that economic vulnerability extends beyond official poverty definitions.
- (d) is incorrect because formalisation is not presented as the central message of the passage.

12. (a)

- I is valid because the passage highlights that people above the official poverty line still face income shocks and vulnerability.
- II is incorrect because the passage argues that underemployment and income volatility, not just unemployment, drive economic vulnerability.

13. (b)

- (a) is incorrect because the passage does not blame liberalization for the lack of labor-intensive growth.
- (b) is correct because the passage points to structural constraints limiting manufacturing's employment and transformative potential.
- (c) is incorrect because the passage does not suggest discouraging the services sector.
- (d) is incorrect because the passage does not claim capital-intensive industries are unsuitable for developing economies.

14. (a)

Only Conclusion I follows

15. (b)

These coin weights follow the pattern  $2n-1$ .

To maximize weight with minimum coins, choose largest denominations:

- $31 + 31 = 62$  (needs 1 more  $\rightarrow +1$ )  $\rightarrow$  3 coins
- $31 + 15 + 15 + 1 + 1 = 63 \rightarrow$  5 coins

So it is possible in fewer than 6 coins.

Thus:

- Statement 1
- Statement 2

Correct Answer: (b)

16. (b)

Seating arrangement: Satish Rahul Varun Pavan Qasim Tony Uttam

17. (c)

Find LCM and subtract the common remainder!

16 in a row  $\rightarrow$  12 left

24 in a row  $\rightarrow$  20 left

25 in a row  $\rightarrow$  21 left

30 in a row  $\rightarrow$  26 left

In all the 4 cases above, the remainder is 4.

$$(16 - 12) = (24 - 20) = (25 - 21) = (30 - 26)$$

$$\text{Hence the required students} = \text{LCM}(16, 24, 25, 30) - 4 = 1200 - 4 = 1196$$

The question is "What is the minimum number of students present in the school?"

Hence the answer is "1196 students minimum"

Choice C is the correct answer.

18. (b)

$$(13^{100} + 17^{100}) = (15 - 2)^{100} + (15 + 2)^{100}$$

Now  $5^2 = 25$ , So, any term that has  $5^2$  or any higher power of 5 will be a multiple of 25. So, for the above question, for computing remainder, we need to think about only the terms with  $15^0$  or  $15^1$ .

$$(15 - 2)^{100} + (15 + 2)^{100}$$

$$\text{Coefficient of } 15^0 = (-2)^{100} + 2^{100}$$

$$\text{Coefficient of } 15^1 = {}^{100}C_1 * 15^1 * (-2)^{99} + {}^{100}C_1 * 15^1 * (-2)^{99}$$

These two terms cancel each other. So, the sum is 0.

$$\text{Remainder is nothing but } (-2)^{100} + 2^{100} = (2)^{100} + 2^{100} 2^{101}$$

$$\text{Remainder of dividing } 2^1 \text{ by } 25 = 2$$

$$\text{Remainder of dividing } 2^2 \text{ by } 25 = 4$$

$$\text{Remainder of dividing } 2^3 \text{ by } 25 = 8$$

$$\text{Remainder of dividing } 2^4 \text{ by } 25 = 16$$

Remainder of dividing  $2^5$  by 25 = 32 = 7  
 Remainder of dividing  $2^{10}$  by 25 =  $7^2 = 49 = -1$   
 Remainder of dividing  $2^{20}$  by 25 =  $(-1)^2 = 1$   
 Remainder of dividing  $2^{101}$  by 25  
 = Remainder of dividing  $2^{100}$  by 25 \* Remainder of dividing  $2^1$  by 25  
 =  $1 * 2 = 2$

The question is “What is the remainder when  $(13^{100} + 17^{100})$  is divided by 25?”

Hence the answer is “2”.

Choice B is the correct answer.

19. (c)

Rule for mirror time on an analog clock:

**Mirror time = 11 : 60 – given time**

For a clock’s **water image (reflection in water)**, the clock is flipped **vertically** (top ↔ bottom).

The rule becomes:

**Water image time = 6: 30 – given time**

20. (b)

Statement 1: 15<sup>th</sup> August 2012 – Wednesday

Statement 2: Maximum gap between two leap years can be of 8 years.

Usually leap years come every 4 years:

- 1996, 2000, 2004, 2008 ...

Gap = 4 years

At a century that is **not divisible by 400**, the leap year is skipped.

Example:

- 1896 → leap year
- 1900 → divisible by 100 but not 400 → **not leap**
- 1904 → leap year

Gap = **1896 to 1904 = 8 years**

21. (c)

- **(a) is incorrect because** the passage warns against viewing crafts as unchanging relics of the past.
- **(b) is incorrect because** the passage does not claim state support is ineffective, only that rigid narratives limit appeal.

- **(c) is correct because** the passage emphasizes moving beyond heritage-centric views and integrating crafts with contemporary realities.
- **(d) is incorrect because** the passage does not solely attribute generational disengagement to policy, but to rigid heritage narratives.

22. (c)

- **I is valid because** the passage states that presenting crafts solely as relics of the past limits their appeal and relevance.
- **II is valid because** the passage explains that rigid heritage narratives can alienate producers (supply) and consumers (demand), affecting overall engagement with the crafts.

23. (d)

- **(a) is incorrect because** the passage does not call for completely abolishing exams, only reorienting pedagogy.
- **(b) is incorrect because** the passage acknowledges test scores but emphasizes broader skills.
- **(c) is incorrect because** the passage does not place responsibility on employers.
- **(d) is correct because** the passage emphasizes moving beyond rote learning to develop critical thinking and adaptability.

24. (c)

- **I is valid because** the passage states rote learning disconnects students from dynamic social and technological transformations.
- **II is valid because** the passage notes that employers value skills beyond memorization and test scores.

25. (a)

A number of the form aabb has to be a multiple of 11.

So, it is the square of either 11 or 22 or 33 or... so on up to 99.

$$88^2 = 7744.$$

This is the only solution possible. Most of these trial and error questions need to be narrowed down a little bit before we can look for the

solution. That narrowing down is critical. In this case, we should look for multiples of 11.

The question is “A 4-digit number of the form aabb is a perfect square. What is the value of a - b?”

Hence the answer is “3”

Choice A is the correct answer

**26. (b)**

**Step-by-step explanation:**

Let time taken to answer a question = t

	Ist	IInd	IIIrd	IVth	
Read	12t	12t	12t	12t	→ 48
Q's	5t	8t	8t	6t	→ 27t
Total	12t	20t	20t	18t	→ 75t

Total time = 75t

10% less = 67.5 t

⇒ Time spent on only reading all 4 passages = 67.5t – 27t = 40.5t

∴ Each passage requires = 40.5/4 = 10.125t

He has to increase his speed by

$12t/10.125t = 1.185$

Increases in speed = 1.185 – 1 = 0.185 i.e. 18.5%

**27. (a)**

Number should be a multiple of 3 and 4. So, the sum of the digits should be a multiple of 3. We can either have all seven digits as 3, or have three 2's and four 3's, or six 2's and a 3.

(The number of 2's should be a multiple of 3).

For the number to be a multiple of 4, the last 2 digits should be 32. Now, let us combine these two.

All seven 3's - No possibility.

Three 2's and four 3's - The first 5 digits should have two 2's and three 3's in some order.

No of possibilities =  $5!3!2! = 10$

Six 2's and one 3 - The first 5 digits should all be 2's. So, there is only one number 222232.

So, there are a total of 10 + 1 = 11 solutions.

The question is “A seven-digit number comprises of only 2's and 3's. How many of these are multiples of 12?”

Hence the answer is “11”

Choice A is the correct answer.

**28. (d)**

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

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

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

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

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

So, number should be of the form                      5, with the first 4 slots taken up by 1, 1, 2, 3.

These can be rearranged in  $4!/2! = 12$  ways.

There are 12 possibilities overall.

The question is “How many numbers of up to 5 digits can be created using the digits 1, 2, 3 and 5 each at least once such that they are a multiple of 15?”

Hence the answer is “12”

Choice D is the correct answer.

**29. (d)**

To determine the value of a such that any prime number greater than 3 is of the form  $ak \pm 1$ , where a and k are natural numbers, we need to explore the nature of prime numbers and divisibility by small integers.

**1. Understanding Prime Numbers Greater Than 3:**

- The first few prime numbers are 2, 3, 5, 7, 11, 13, 17, etc.
- Notice that except for 2 and 3, all prime numbers are not divisible by 2 or 3.

**2. Forming the Expression  $ak \pm 1$ :**

- Since any number can be expressed in the forms  $ak$ ,  $ak + 1$  or  $ak - 1$  we need to explore these for a specific a.

- Choose  $a = 6$  then you have:
- Any number can be written as  $6k, 6k + 1, 6k + 2, 6k + 3, 6k + 4, \text{ or } 6k + 5$ .
- A prime number greater than 3 cannot be of the forms  $6k, 6k + 2, 6k + 3$  or  $6k + 4$  because
- $6k$ : Divisible by 6
- $6k + 2$ : Divisible by 2
- $6k + 3$ : Divisible by 3
- $6k + 4$  Divisible by 2,

3. **\*\*Valid Forms for Primes Greater Than 3: \*\***

- Therefore, prime numbers greater than 3 can only be in the forms  $6k + 1$  or  $6k + 5$  (which is the same as  $6k - 1$ )
- Thus, the correct value of  $a$  for the condition that all prime numbers greater than 3 are either of the form  $ak + 1$  or  $ak - 1$  is 6.
- Therefore, the correct multiple-choice answer is (d) 6.

30. (b)

Let the **cost price (CP) = 100**.  
 He gives successive discounts **15%, 10%, 20%** and still earns **12% profit**, so final selling price = **112**. Net discount factor  
 Successive discount factor:  
 $0.85 \times 0.90 \times 0.80 = 0.612$   
 Final SP =  $0.612 \times \text{Marked Price (MP)}$   
 Given SP = 112:  
 $0.612 \times \text{MP} = 112$ , hence  $\text{M.P} = 112 / 0.612 = 183.006$ .  
 SP after only first discount (15%)  
 $\text{SP}_1 = 0.85 \times 183.006 \approx 155.56$   
 Profit % =  $(155.56 - 100) / 100 \times 100 = 55.56\%$

31. (a)

- (a) Correct — the passage explicitly concludes that sustainable water management needs both behavioral change and infrastructure/technology improvements.
- (b) Incorrect — the passage clearly states behavioral adjustments **alone are unlikely to suffice**.

- (c) Incorrect — the passage emphasizes **both household and infrastructural changes**, not infrastructure alone.
- (d) Incorrect — the passage never claims water scarcity will disappear; it only discusses **improving sustainability**.

32. (c)

- 1 Valid — aligns with the passage’s emphasis on household behavioral change via efficient appliances.
- 2 Valid — addresses infrastructure improvements like leak-proof distribution systems.
- 3 Valid — aligns with wastewater recycling and reuse mentioned in the passage.
- 4 Valid — incorporates water-efficient design in housing, a practical extension of demand-side measures.
- 5 Invalid — large dams/reservoirs are **not discussed**; the focus is on efficiency and conservation, not supply expansion.
- 6 Valid — promotes decentralized solutions, consistent with sustainable management in the passage.

33. (b)

- (a) Incorrect — the passage emphasizes recycling and reuse rather than immediate mining curbs.
- (b) Correct — captures the dual message of environmental and economic importance of recycling and design for reuse.
- (c) Incorrect — the passage does not claim electronics are the main source of global degradation.
- (d) Incorrect — informal recycling is mentioned as harmful, but the passage focuses on organized systems, not a complete ban.

34. (c)

- I Valid — passage states that recovering materials reduces pressure on primary mining.
- II Valid — passage notes that closing material loops is both an environmental imperative and an economic necessity.

35. (c)

$x$  = product of five consecutive integers  
 -> divisible by  $6! = 720$ , hence true

Statement 2:  $144 = 2^4 \times 3^2$ , six consecutive integers always contain these powers of 2 and 3. Hence true.

36. (a)

Let the area of backyard be  $M^2$  this year and  $N^2$  last year

$$\therefore M^2 - N^2 = 149$$

$$\Rightarrow (M+N)*(M-N) = 149$$

Now, 149 is a prime number

$$\Rightarrow (M+N)*(M-N) = 149 \times 1$$

$$\Rightarrow M+N = 149$$

$$M-N = 1$$

$$\Rightarrow 2M = 150 \Rightarrow M = 75$$

$$\text{and } N = 74$$

$$\therefore \text{Number of tomatoes produced this year} = 75^2 = 5625$$

37. (b)

Let:

- S = email is spam
- N = email is non-spam
- D = detected as spam by SPAMKILL

Given,  $P(S)=0.5$

- $P(D|S)=0.99$  (detects spam correctly)
- $P(D|N)=0.05$  (false positive rate)

TO calculate :  $P(N|D)$  = probability that email is **non-spam given it was detected as spam.**

Total probability of “detected as spam”

$$P(D) = P(D|S)P(S) + P(D|N)P(N) = 0.99(0.5) + 0.05(0.5) = 0.495 + 0.025 = 0.52$$

Apply Bayes’ theorem

$$P(N|D) = P(D|N) \times P(N) / P(D) = 0.05 \times 0.5 / 0.52 = 0.025 / 0.52 = 5/104$$

38. (b)

$$\text{Statement 1: Required probability} = (0.5 \times 0.3) + (0.3 \times 0.4) + (0.2 \times 0.25) = 0.32$$

$$\text{Statement 2: Required Probability} = (0.3) \times (0.4) / 0.32 = 0.375$$

39. (a)

Let us find the one pair of values for a, b.

$a = 4, b = 19$  satisfies this equation.

$$2*4 + 5*19 = 103.$$

Now, if we increase ‘a’ by 5 and decrease ‘b’ by 2 we should get the next set of numbers. We can keep repeating this to get all values.

Let us think about why we increase ‘a’ by 5 and decrease b by 2.

$a = 4, b = 19$  works.

Let us say, we increase ‘a’ by n, then the increase would be  $2n$ .

This has to be offset by a corresponding decrease in b.

Let us say we decrease b by ‘m’.

This would result in a net drop of  $5m$ .

In order for the total to be same,  $2n$  should be equal to  $5m$ .

The smallest value of m, n for this to work would be 2, 5.

$$a = 4, b = 19$$

$$a = 9, b = 17$$

$$a = 14, b = 15 \dots$$

And so on till

$$a = 49, b = 1$$

We are also told that ‘a’ should be greater than ‘b’, then we have all combinations from (19, 13) ... (49, 1).

7 pairs totally.

Choice A is the correct answer.

40. (a)

A B C E D

41. (d)

- **I** Valid — passage states insulated leaders may overlook inconvenient facts and make flawed decisions.
- **II** Valid — passage emphasizes that constructive opposition ensures accountability and transparency.
- **III** Valid — suppressing dissent risks stagnation and arbitrary governance.
- **IV** Invalid — passage warns that hostility is not beneficial; democracy flourishes through responsible contestation, not perpetual hostility.
- **V** Valid — supporters’ partisan enthusiasm can make them overlook flaws.

- **VI Invalid** — the passage does not condition the opposition’s role on rule-bound government actions; it stresses constructive balance rather than obstruction.

42. (c)

- (a) Incorrect — loyal supporters can blind leaders to flaws. No mention of opposition being subservient.
- (b) Incorrect — passage argues the opposite: suppressing dissent risks stagnation and arbitrariness.
- (c) Correct — captures the core message: criticism is essential, and constructive opposition strengthens democracy.
- (d) Incorrect — the passage states opposition, when responsible, **strengthens** rather than weakens democratic institutions.

43. (c)

- (a) Incorrect — passage highlights that markets operate **despite incomplete information**, not only with complete information.
- (b) Partially true — risk is mentioned, but the passage emphasizes trust as the key mechanism, not just risk’s existence.
- (c) Correct — captures the central idea that trust allows transactions to proceed despite uncertainty.
- (d) Incorrect — regulations reduce uncertainty but do not replace the role of trust, which is central in the passage.

44. (c)

Series is:  $9^0, 8^1, 7^2, 6^3, 5^4, 4^5, 3^6, 2^7, \dots$

45. (b)

Let  $S_1, S_2$  be the salaries of their first year and  $d_1$  and  $d_2$  be the difference between salaries of two consecutive years.

Now, the sum of  $x$  terms of their salaries are

$$S_x = x/2 * [2s_1 + (x-1)d_1]$$

$$S'_x = x/2 * [2s_2 + (x-1)d_2]$$

$$\text{Hence, } x/2 * [2s_1 + (x-1)d_1] = 3x+4$$

$$x/2 * [2s_2 + (x-1)d_2] = 2x+11$$

$$\text{i.e. } [2s_1 + (x-1)d_1] = (3x+4)$$

$$[2s_2 + (x-1)d_2] = (2x+11)$$

Ratio of Salaries earned by them in the 9<sup>th</sup> year =  $(s_1+8d_1) / (s_2+8d_2)$

$$\text{i.e. } (2s_1 + 16d_1)/(2s_2+16d_2) = (2s_1 + (17-1)d_1)/(2s_2+(17-1)d_2) = (3 \times 17+4)/(2 \times 17+11) = 55/45 = 11/9$$

46. (a)

First translate the symbols into inequalities.

◆ Symbol meanings

- $C \& D \rightarrow C = D$
- $C \wedge D \rightarrow C < D$
- $C * D \rightarrow C > D$
- $C \% D \rightarrow C \geq D$
- $C @ D \rightarrow C \leq D$

Convert the statements

1.  $M \% R \rightarrow M \geq R$
2.  $R * N \rightarrow R > N$
3.  $N \wedge T \rightarrow N < T$
4.  $T @ S \rightarrow T \leq S$

From (1) & (2):

$$M \geq R > N \Rightarrow M > N$$

From (3) & (4):

$$N < T \leq S \Rightarrow S > N$$

Overall order:

$$M \geq R > N < T \leq S$$

Conclusions: I.  $S * N \rightarrow S > N$

From chain  $S \geq T > N \Rightarrow$  **True**

$M * N \rightarrow M > N$

From  $M \geq R > N \Rightarrow$  **True**

$T * R \rightarrow T > R$

We know:

$R > N$  and  $T > N$  — but no fixed relation between  $T$  and  $R$  Not definite

47. (b)

Write the numbers in digit form:

$$ASK = 100A + 10S + K$$

$$AN = 10A + N$$

$$AAM = 110A + M$$

Given  $S = 3$

$$(100A + 30 + K) - (10A + N) = 110A + M$$

$$90A + 30 + K - N = 110A + M$$

$$K - N + 30 = 20A + M$$

Since digits are 1–9, , and all digits are distinct.

Checking valid combinations gives:

$$K = 8, 9, 6$$

Sum of distinct values of :

$$8 + 9 + 6 = 23$$

Answer: 23

48. (b)

**Step 1: Identify the coding pattern**

Observe the examples.

**PRIME**

$$P = 16$$

$$R = 18$$

$$I = 9$$

$$M = 13$$

$$E = 5$$

These are simply the **alphabet positions**.

**CHAIR**

$$C = 3$$

$$H = 8$$

$$A = 1$$

$$I = 9$$

$$R = 18$$

Again **alphabetical positions**.

Thus, the code = **alphabet position of letters**.

**Step 2:** Code TABLE

$$T = 20$$

$$A = 1$$

$$B = 2$$

$$L = 12$$

$$E = 5$$

Series becomes:

$$20, 1, 2, 12, 5$$

**Step 3:** Arrange in ascending order

$$1, 2, 5, 12, 20$$

**Step 4:** Find required difference

$$\text{Largest} = 20$$

$$\text{Smallest} = 1$$

$$20 - 1 = 19$$

49. (d)

Basic information

Total words = **1950**

Deadline = **5:00 PM**

If Arjun starts at **3:00 PM**

Speed = **20 words/min**

Available time = **120 minutes**

Words he could type:

$$20 \times 120 = 2400$$

So **he can finish earlier than 5 PM.**

Speed increase rule

For every **2 minutes after 3 PM**, speed increases by **1 word/min**.

Thus speed increases slowly while **time available decreases**.

We check the **options directly**.

Option (b) 3:30 PM

Delay after 3 PM:

30 minutes

Speed increase:

$$30/2 = 15$$

New speed:

$$20 + 15 = 35$$

Time available:

$$5:00 - 3:30 = 90 \text{ minutes}$$

Words typed:

$$90 \times 35 = 3150$$

He easily finishes the work.

Option (c) 4:10 PM

Delay after 3 PM:

70 minutes

Speed:

$$20 + 35 = 55 \quad 20 + 35 = 55 \quad 20 + 35 = 55$$

Time available:

$$5:00 - 4:10 = 50 \text{ minutes}$$

Words typed:

$$50 \times 55 = 2750$$

Still enough.

Option (d) 4:30 PM

Delay after 3 PM:

90 minutes

Speed increase:

$$90/2 = 45$$

Speed:

$$20 + 45 = 65$$

Time available:

5:00 – 4:30 = 30 minutes

Words typed:

$30 \times 65 = 1950$

Exactly **1950 words**.

So he finishes **exactly at 5 PM**.

Final Answer: 4:30 PM

**50. (a)**

Each number ends in 7:

7,17,27,37,...,197

So the unit digit of the product depends on

$7^{(\text{number of terms})}$

**Number of terms:**

The numbers increase by **10**:

7,17,27,...,197

Number of terms:

$(197-7)/10 + 1 = 20$

So we need the unit digit of  $7^{20}$ . Hence, Cycle:

**7, 9, 3, 1** (length = 4)

$20 \bmod 4 = 0$ . So the unit digit corresponds to the **4th number in the cycle = 1**.

**51. (a)**

- **(a)** Correct — the passage emphasizes that preserving genetic diversity is essential to maintain resilience while improving productivity.
- **(b)** Incorrect — the passage warns that productivity alone cannot ensure long-term stability.
- **(c)** Incorrect — wild populations are highlighted as important for genetic variability and adaptability.
- **(d)** Incorrect — low genetic diversity is cited as a key factor in vulnerability to disease, not water quality.

**52. (b)**

- **I** Valid — the passage explicitly states reduced genetic diversity increases vulnerability.
- **II** Invalid — the passage warns against prioritizing productivity without considering long-term risks.
- **III** Valid — maintaining genetic variability

improves resilience, as stated in the passage.

- **IV** Invalid — wild populations are described as important for adaptability.
- **V** Valid — selective breeding improves growth and resistance but narrows adaptability, as mentioned in the passage.

**53. (a)**

- **(a)** Correct — aligns with the passage’s emphasis on cultivating critical thinking, creativity, ethical reasoning, and intellectual autonomy.
- **(b)** Incorrect — the passage critiques the current focus on grades, rankings, and placements.
- **(c)** Incorrect — passage argues that performing well in exams alone does **not** make reforms unnecessary.
- **(d)** Incorrect — passage stresses that intellectual autonomy is more important than merely maintaining administrative priorities.

**54. (c)**

Let the initial quantity of the mixture be **x litres**.

Given ratio of **apple: grapes: pomegranate = 4 : 6 : 5**

Total parts = 15

Initial quantities:

- Apple =  $4x/15$ , Grapes =  $6x/15$  and Pomegranate =  $5x/15$

Removed in the same ratio:

- Apple removed =  $15 \times 4/15 = 4$ , remaining =  $4x/15 - 4$
- Grapes removed =  $15 \times 6/15 = 6$ , remaining =  $6x/15 - 6$
- Pomegranate removed =  $15 \times 5/15 = 5$ , remaining =  $5x/15 - 5$

Add 8 L apple and 2 L grapes: Apple =  $4x/15 - 4 + 8 = 4x/15 + 4$  and Grapes =  $6x/15 - 6 + 2 = 6x/15 - 4$

Apple quantity is 10 litres less than grapes qty i.e.

$4x/15 + 4 = 6x/15 - 4 - 10$ , on solving we get  $x = 135$  litres

55. (b)

Let us do this iteratively. Feb 29th 2012 = Wednesday => Feb 28th 2012 = Tuesday

Feb 28th 2013 = Thursday (because 2012 is a leap year, there will be 2 odd days)

Feb 28th 2014 = Friday, Feb 28th 2015 = Saturday, Feb 28th 2016 = Sunday, Feb 29th 2016 =

Monday

Or, Feb 29th to Feb 29th after 4 years, we have 5 odd days.

So, every subsequent birthday, would come after 5 odd days.

2016 birthday - 5 odd days

2020 birthday - 10 odd days = 3 odd days

2024 birthday - 8 odd days = 1 odd day

2028 birthday - 6 odd days

2032 birthday - 11 odd days 4 odd days

2036 birthday - 9 odd days = 2 odd days

2040 birthday - 7 odd days = 0 odd days.

So, after 28 years he would have a birthday on Wednesday

The next birthday on Wednesday would be on 2068 (further 28 years later), the one after that would be on 2096. His 84th birthday would again be a leap year.

Now, there is a twist again, as 2100 is not a leap year. So, he does not have a birthday in 2100. His next birthday in 2104 would be after 9 odd days since 2096, or 2 odd days since 2096, or on a Thursday.

From now on the same pattern continues. 2108 would be 2 + 5 odd days later = 7 odd days later.

Or, 2108 Feb 29th would be a Wednesday.

So, there are 4 occurrences of birthday falling on Wednesday 2040, 2068, 2096 and 2108.

The question is “How many birthdays would he celebrate on a Wednesday?”

Hence, the answer is “4”.

Choice B is the correct answer.

56. (c)

$$a^m b^n = 144^{145}$$

$$a^m b^n = (2^4 \times 3^2)^{145}$$

$$a^m b^n = 3^{290} \times 2^{580}$$

Since the highest power of a prime in the prime factorization of  $144^{145}$  is 580, n can never be more than 580. Since m is a natural number the smallest value that m can take is 1. So, the maximum value of (n - m) is  $580 - 1 = 579$ .

When  $a^m b^n = (3^{290})^1 \times 2^{580}$ , where  $a = 3^{290}$ ;  $m = 1$ ;  $b = 2$ ;  $n = 580$ .

The question is “Let a, b, m and n be natural numbers such that  $a > 1$  and  $b > 1$ . If  $a^m b^n = 144^{145}$ , then the largest possible value of  $n - m$  is “

Hence, the answer is ‘579’

Choice C is the correct answer.

57. (a)

We need to know whether

$a(a+1)(a+2)$  is divisible by  $48 = 16 \times 3$ .

For any three consecutive integers, one is divisible by 3  $\Rightarrow$  product is **always divisible by 3**.

So we only need to check divisibility by **16**

Statement (1): a is even

Let  $a=2k$ . Then numbers are:

$2k, 2k+1, 2k+2$

Product:

$$2k \cdot (2k+1) \cdot 2(k+1) = 4k(k+1)(2k+1)$$

This guarantees factor 4, but not necessarily 16.

Examples:

- $x=2 \rightarrow$  product =  $2 \cdot 3 \cdot 4 = 24$  (not divisible by 16)
- $x=6 \rightarrow$  product =  $6 \cdot 7 \cdot 8 = 336$  (divisible by 16)

Not sufficient.

Statement (2):  $4x$  is divisible by 32

$4x$  divisible by 32  $\Rightarrow x$  divisible by 8  $\Rightarrow x=8k$ .

Numbers:

$$8k, 8k+1, 8k+2 = 2(4k+1)$$

Product has factors  $8k$  and  $2(4k+1) \Rightarrow$  factor 16 always present

As noted earlier, any three consecutive integers give a factor 3.

Hence product divisible by  $16 \times 3 = 48$

Sufficient.

58. (b)

Width = 6 m, tile side = 0.3 m → tile area = 0.09 m<sup>2</sup>

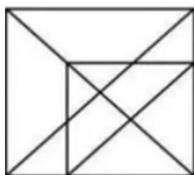
(1) Length = 2 × 6 = 12 m

Area = 72 m<sup>2</sup> → tiles = 72 / 0.09 = 800 → sufficient

(2) Area = 72 m<sup>2</sup> → tiles = 72 / 0.09 = 800 → sufficient

59. (c)

To determine the number of triangles in the given figure, follow these steps:



1. Identify Small Triangles: Count the smallest triangles formed by the intersections. This figure has 8 smallest triangles.

2. Combine Small Triangles to Form Larger Ones:

▲ Combine two small triangles to form larger triangles. There are 6 such combinations.

3. Combination of Three or More Triangles: Check for combinations leading to larger triangles:

▲ Three triangles can form another 4 larger triangles.

4. Count Overlapping and Cross-Triangle Configurations:

▲ Crossing lines create unique triangles. There are 3 such configurations.

5. Total Count of Triangles: Add all the triangles from the above steps:

$$8+6+4+3=21$$

Thus, the total number of triangles in the given figure is 21.

60. (b)

Let us try out a few values to see if that gives us anything.

When x = 8, 10, 12, ....100 this goes to zero. So, these cannot be counted.

When x = 101, 102 or beyond, all the terms are positive, so the product will be positive.

So, straight-away we are down to numbers 1, 2, 3, ...7 and then odd numbers from there to 99.

Let us substitute x =1,

All the individual terms are negative. There are totally 47 terms in this list. Product of 47 negative terms will be negative.

So, x = 1 works. So, will x =2, 3, 4, 5, 6, and 7.

Remember, product of an odd number of negative terms is negative; product of even number of negative terms is positive. Now, this idea sets up the rest of the question.

When x = 9, there is one positive terms and 46 negative terms. So, the product will be positive.

When x = 11, there are two positive terms and 45 negative terms. So, the product will be negative.

When x = 13, there are three positive terms and 44 negative terms. So, the product will be positive.

and so on.

Essentially, alternate odd numbers need to be counted, starting from 11.

So, the numbers that will work for this inequality are 1, 2, 3, 4, 5, 6, 7...and then 11, 15, 19, 23, 27, 31,..... and so on.

What will be the last term on this list?

99, because when x = 99, there are 46 positive terms and 1 negative term.

So, we need to figure out how many terms are there in the list 11, 15, 19,....99. These can be written as

$$4 * 2 + 3$$

$$4 * 3 + 3$$

$$4 * 4 + 3$$

$$4 * 5 + 3$$

$$4 * 6 + 3...$$

$$4 * 24 + 3$$

A set of 23 terms. So, total number of values = 23 + 7 = 30. 30 positive integer values of x exist satisfying the condition.

The question is “How many positive integer values can x take that satisfy the inequality

$$(x - 8)(x - 10)(x - 12)\dots(x - 100) < 0?$$

Hence the answer is “30”

61. (b)

- (a) Incorrect — passage does not advocate replacing public health with private services.
- (b) Correct — aligns with the passage’s conclusion that structural and investment constraints limited public health growth relative to the private sector.
- (c) Incorrect — the passage acknowledges some flagship programmes had positive impacts.
- (d) Incorrect — private healthcare growth is linked to broader factors, not solely urbanization.

62. (b)

- 1 Valid — passage highlights limited investment as a constraint, so increasing expenditure is logical.
- 2 Valid — addresses staff shortages noted in the passage.
- 3 Invalid — private hospitals are growing, but the passage does not suggest replacing public healthcare with private facilities.
- 4 Valid — building on successful flagship programs aligns with practical policy implications.
- 5 Invalid — focusing only on urban centers ignores the need for equitable public health development.
- 6 Valid — regulatory frameworks and partnerships can help improve efficiency and equity, addressing structural constraints.

63. (c)

- (a) Agree — passage emphasizes vitality comes from interaction with evolving culture.
- (b) Agree — passage notes framing as elite heritage risks alienating youth and emerging artists.
- (c) Disagree — passage critiques prioritizing tradition over innovation as potentially limiting relevance.

- (d) Agree — passage states cultural forms evolve through adaptation and reinterpretation.

64. (c)

To maximize revenue, check earning per person:

- Single: 2000 per person
- Double:  $3200/2 = 1600$  per person
- Triple:  $4200/3 = 1400$  per person

Single occupancy gives the **highest revenue per person**, so we should use as many single rooms as possible. We can assign at most 25 rooms as singles → 25 people accommodated.

Remaining people =  $60 - 25 = 35$  people

Rooms left = 0 (all rooms used), so we must convert some single rooms into double/triple rooms to fit everyone.

Each time we upgrade:

- Single → Double adds +1 person and +₹1200 revenue
- Single → Triple adds +2 people and +₹2200 revenue

Revenue gained per extra person:

- Double upgrade: ₹1200 per extra person
- Triple upgrade:  $₹2200 / 2 = ₹1100$  per extra person

Double upgrades give more revenue per added person. Use as many doubles as possible.

We need space for 35 extra people → convert **all 25 rooms to double** first:

People accommodated =  $25 \times 2 = 50$

Still need space for 10 more people.

Convert 10 double rooms → triple rooms (each adds 1 more person):

So final distribution:

- Triple rooms = 10
- Double rooms = 15
- Single rooms = 0

Hence total revenue: 5 triple rooms →  $10 \times 4200 = ₹42,000$

• 15 double rooms →  $15 \times 3200 = ₹48,000$

Total revenue =  $42,000 + 48,000 = ₹90,000$

Bottom of Form

65. (b)

Let the originally planned average speed be  $v$  km/h.

Planned travel time:  $11200/v$

Because of the 3-hour delay, but with only a 1-hour late arrival, the new travel time must be **2 hours less** than the originally planned travel time.

With the increased speed ( $v + 100$ ), travel time becomes:

$$11200/(v+100)$$

So,

$11200/(v+100)=11200/v - 2$ , we get  $v = 700$  km/h. So original planned time =  $11200/700 = 16$  hours. If speed were increased by 350 km/h, new speed = 1050 km/h.

**New travel time:**

$11200/1050 = 10\text{h } 40 \text{ min}$ . Hence, actual departure = 7:30 AM + 3 hours = 10:30 AM and hence, Arrival time 10:30 AM + 10h 40 min = 9:10 PM

66. (a)

Let the number of students in Classes I to X be an arithmetic progression with first term  $a$  and common difference  $d$ .

So the class strengths are:

$$a, a+d, a+2d, \dots, a+9d.$$

Sum of first 4 classes = 462

$$4/2 \times (2a+3d) = 462 \Rightarrow 2a+3d=231$$

**Sum I-V:**

$$5/2 \times (2a+4d)$$

**Sum VI-X (first term  $a+5d$ ):**

$$5/2 \times (2a+14d)$$

Given:

$$\text{Sum I-V} = 2 \times \text{Sum VI-X}$$

On solving we get, Class VI =  $a + 5d = 132 + 5(-11) = 132 - 55 = 77$

67. (b)

Let A's normal one-day work =  $a$

Let B's normal one-day work =  $b$

Total work = 1.

**Given conditions**

**Case 1:** A works at twice efficiency, B at half efficiency  $\rightarrow$  finished in 17 days

$$(2a+1/2 \times b) \times 17 = 1 \Rightarrow 2a + b/2 = 1/17$$

**Case 2:** A works at five times efficiency, B at one-fourth efficiency  $\rightarrow$  finished in 10 days

$$(5a+1/4 \times b) \times 10 = 1 \Rightarrow 5a + b/4 = 1/10$$

Solving these we get,  $a = 3/170, b = 4/85$ .

**Time for B alone:** B's one-day work =  $4/85$ , Days needed:  $1/b = 85/4 = 21.25$

68. (b)

Let selling price (same for both) =  $x$

For first trade (calculation on CP):

If CP =  $p$

$$20\% \text{ profit means: } x = p + \frac{20p}{100} = 1.2p$$

$$\therefore p = \frac{x}{1.2}$$

$$\text{Actual profit} = x - \frac{x}{1.2} = \frac{0.2x}{1.2} = \frac{x}{6}$$

For Second Trade (calculation on SP):

$$20\% \text{ profit on SP means: Profit} = \frac{20x}{100} = 0.2x$$

If CP =  $q$

$$x - q = 0.2x$$

$$q = 0.8x$$

$$\text{Actual profit} = x - 0.8x = 0.2x$$

Given that difference in profits = 85

$$0.2x - \frac{x}{6} = 85$$

$$\frac{6(0.2x) - x}{6} = 85$$

$$\frac{1.2x - x}{6} = 85$$

$$\frac{0.2x}{6} = 85$$

$$0.2x = 510$$

$$x = 2550$$

Therefore, the selling price is Rs 2550

69. (d)

Let original price =  $P$

After raising by  $M\%$

New price =  $P(1+M/100)$

After discount of N% on this raised price, final price again becomes P:

$P(1+M/100)(1-N/100) = P$ , on solving we get,  
 $100(M-N) = MN$

Also given that,  $N = M-N$  i.e.  $M = 2N$ , hence we get,  $M = 100$ .

70. (b)

Let total original budget = ₹12,00,000.

From the pie chart:

- Production (28%) =  $0.28 \times 12,00,000$   
= ₹3,36,000
- Marketing (18%) = ₹2,16,000
- R&D (16%) = ₹1,92,000
- HR (12%) = ₹1,44,000
- IT (14%) = ₹1,68,000
- Logistics (12%) = ₹1,44,000

Apply revisions

**Production +25%** :  $3,36,000 \times 1.25 = 4,20,000$

**Marketing -10%** :  $2,16,000 \times 0.9 = 1,94,400$

**R&D +15%** :  $1,92,000 \times 1.15 = 2,20,800$

**HR unchanged** = 1,44,000

**Logistics unchanged** = 1,44,000

**IT + ₹42,000** :  $1,68,000 + 42,000 = 2,10,000$

New total budget

$4,20,000 + 1,94,400 + 2,20,800 + 1,44,000 + 2,10,000 + 1,44,000 = 13,33,200$

New Production percentage

$4,20,000/13,33,200 \times 100 \approx 31.5\%$

71. (a)

- (a) Correct — captures the core idea: economic growth raises energy demand, leading to inefficiency and environmental stress unless systems change.
- (b) Incorrect — passage does not claim transmission efficiency is improving or that fossil electricity expansion is the primary focus.
- (c) Incorrect — energy inequality is mentioned but not attributed mainly to uneven renewable adoption.
- (d) Incorrect — passage says renewables can help, not that they completely solve efficiency and environmental problems.

72. (a)

(a) Correct: The entire passage repeatedly emphasizes that **no country has achieved**

**sustained economic transformation without industrial expansion**, making it the central message.

(b) Incorrect: The passage never suggests governments should withdraw from regulating industries.

(c) Incorrect: Agriculture is only mentioned as the starting sector; the passage focuses on the **importance of industrialization**, not equal importance.

(d) Incorrect: Increased tax revenue for social programmes is mentioned as **one consequence**, not the main message.

73. (d)

**Assumption I Incorrect:**

The passage states that **industrialization stimulates technological innovation**, but it never assumes that **higher labour productivity itself causes innovation**.

**Assumption II Incorrect:**

The passage only says that a **dynamic industrial sector enlarges the tax base**, not that agricultural economies **cannot finance public goods or that their ability is negligible**.

74. (b)

**If C was the thief** →

A says B thief false

B says C thief true

C says not thief false → two false

Assume **A is the thief**

- A says B is thief → **False**

- B says C is thief → **False**

- C says I am not thief → **True**

Two false → Not allowed

**If B was thief** →

A true, B false, C true → exactly one false

Answer: B is the thief. B is lying.

75. (b)

Total sales for each mobile

**M1:**  $35 + 10 + 25 + 25 + 20 = 115$  → Avg =  $115/5 = 23$

**M2:**  $12 + 18 + 14 + 16 + 10 = 70$  → Avg = **14**

**M3:**  $22 + 28 + 16 + 14 + 20 = 100$  → Avg = **20**

**M4:**  $6 + 14 + 13 + 17 + 15 = 65$  → Avg = **13**

**M5:**  $45 + 5 + 10 + 7 + 13 = 80$  → Avg = **16**

Overall average of all mobiles

Total of all values:

2015 = 120

2016 = 75

2017 = 78

2018 = 79

2019 = 78

Grand total = **430**

Overall average =  $430 / 25 = 17.2$

Hence, only M1 and M3 have higher averages than 17.2.

Hence, answer is two.

**76. (b)**

Statement 1: Fermat’s Little Theorem

If **p** is a prime number and **a** is not divisible by **p**, then:

- $a^{p-1} \equiv 1 \pmod{p}$ .
- $p = 997$  (prime)
- $a = 3$

So,

$3^{996} \equiv 1 \pmod{997}$

Multiply both sides by 3:

$3^{997} \equiv 3 \pmod{997}$ . Hence, the remainder is **3**, not 1.

Statement 2: Sum of numbers from 0 to n:

Sum =  $n(n+1)/2$ ,  $n=110$ , so sum = 6105, hence unit digit = 5.

**77. (b)**

If a number is divided by  $3^n$ , then it will be divisible by 3,  $3^2$ , .....,  $3^{n-1}$ .

$P = 3^n + 1$ , P is a five digit number,  $3^8 = 19683$ ,  $3^9 = 19683$ , Hence  $P = 19683 + 1 = 19684$ , hence  $n = 9$

**78. (c)**

Statement 1:  $27000 - 8000 - 1000 = 18000$

$18000 = 2^4 \times 3^2 \times 5^3$

Factors =  $(5)(3)(4) = 60$

Statement 2:  $S = 72 + 66 + 60 + 54 + \dots$

$D = 66 - 72 = -8$ . General term of A.P,  $t_n = a + (n-1)d$ ,

$0 = 72 + (n-1)(-6) \Rightarrow n = 13$ . Hence,  $S_{max} = 13/2 (72+0) = 468$

**79. (d)**

Statement 1: Count them by number of digits:

- **1-digit numbers:** choose any 1 of the 4 digits = 4

- **2-digit numbers:** permutations of 4 digits taken 2  
=  $4P2 = 4 \times 3 = 12$

- **3-digit numbers:** permutations of 4 digits taken 3  
=  $4P3 = 4 \times 3 \times 2 = 24$

- **4-digit numbers:** permutations of all 4 digits  
=  $4P4 = 4! = 24$

Total numbers:

$4 + 12 + 24 + 24 = 64$

Statement 2: 4-digit numbers greater than 4000  
The thousands digit must be **4, 5, or 6** → 3 choices.

After choosing the first digit, we choose and arrange 3 of the remaining 4 digits:

Number of ways = permutations of 4 digits taken 3

$= 4 \times 3 \times 2 = 24$ . Hence, Total 4-digit numbers:  $3 \times 24 = 72$

5-digit numbers

All 5-digit numbers formed from these digits are greater than 4000 (the smallest is 13456).

Number of such numbers:  $5! = 120$ .

**Total numbers =  $72 + 120 = 192$**

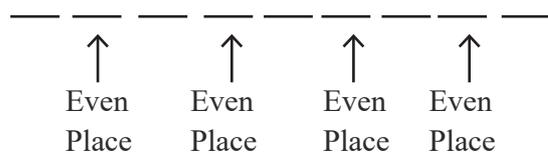
**80. (c)**

Here, even digits are 6 and 8.

Number of digit “6” presents = 2

Number of digit “8” presents = 2

Total even digits = 4



Total 4 even places presents.

Number of ways to put those 4 digits in those 4 places =  $({}^4C_4 \times 4!)/2! \times 2!$

Now remaining 5 digits (three 5 and two 7) can be put in those five places in  $({}^5C_5 \times 5!)/3! \times 2!$

Ways. Hence, total possible 9 digit numbers

$= 4!/(2! \times 2!) \times 5!/(3! \times 2!) = 60$  ways

