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CONTENTS

Reading Comprehension

UPSC CSE 2025 GS Paper-II (Questions and Explanation)

Directions for the following 4 (four) items:

Read the following two passages and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage - 1

In our country, regrettably, teaching and learning for the examination have been our forte but the new demands of society and the future of work require critical and independent thinking, learning through doing, asking questions from multiple disciplinary perspectives on the same issue, using evidence for building arguments, and reflecting and articulation. Higher education should not "either be a mere servant of the government policy or a passive respondent to public mood." Higher learning is all about how to think rather than what to think. Teaching has to be re-invented.

1. Which one of the following statements best reflects the central idea conveyed by the passage?

(*a*) India does not have enough resources for promoting quality education in its universities.

(*b*) The institutions of higher learning in the country should not be under the control of the Government.

(*c*) Classroom approach to higher education should be done away with.

(*d*) Classroom needs to be reimagined and teaching needs to be re-invented.

Ans: (*d*)

Option (*a*) is incorrect: The passage does not discuss resource availability or funding issues for higher education.

Option (*b*) is incorrect: The passage mentions that higher education should not be a mere servant of government policy or public mood, but it does not explicitly call for removal of government control.

Option (*c*) is incorrect: The passage does not advocate for eliminating classroom approaches but suggests reimagining the classroom and reinventing teaching methods.

Option (*d*) is correct: The passage emphasizes the need for **critical and independent thinking**, **learning by doing**, and **teaching to be reinvented**, suggesting a **reimagined classroom** and innovative teaching.

2. With reference to the above passage, the following assumptions have been made:

I. Higher education is a constantly evolving subject that needs to align towards new developments in all spheres of society.

II. In our country, sufficient funds are not allocated for promoting higher education.

Which of the above assumptions is/are valid?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*a*)

Assumption I is correct: The passage implies that higher education must evolve and adapt to **new societal demands and future work requirements**, which aligns with this assumption.

Assumption II is incorrect: The passage does not mention funding or financial allocation issues. Therefore, assuming a lack of funds is unsupported.

Passage - 2

If there is inequality in the pattern of population growth, there is greater inequality in food production and utilization. As societies become wealthier, their consumption of animal products increases. This means that a greater proportion of such basic foodstuff as grains and legumes that could feed humans directly is instead being converted into feed for poultry and large farm animals. Yet this conversion of plant-based food into animal food for humans is far from efficient. Only 16% of the calories fed to chickens are recovered by us when we eat them. This conversion rate goes down to five to seven per cent in large animals that are fed grain to add fat and some protein before slaughter.

3. Which one of the following statements best reflects the crux of the passage?

(*a*) There is an urgent need for a public policy to promote the consumption of cereal-based foods in wealthier societies.

(*b*) Animal-based food is far less efficient than grain/plant-based food in terms of production and utilization.

(*c*) Plant-based protein should replace the animal-based protein in our daily diets.

(*d*) Inequality in food production and consumption is inevitable in any fast changing society.

Ans: (*b*)

Option (*a*) is incorrect: Although the passage points out inefficiencies, it does not explicitly call for public policy to promote cereal-based food consumption in wealthier societies.

Option (*b*) is correct: The passage **clearly shows that animal-based food production is less efficient than directly consuming grain/plant-based foods**, supporting this statement as the central idea.

Option (*c*) is incorrect: The passage discusses efficiency but does not explicitly advocate for replacing animal protein with plant protein in diets.

Option (*d*) is incorrect: While inequality is mentioned, the passage does not suggest it is inevitable or focus on this as the main idea.

4. With reference to the above passage, the following assumptions have been made:

I. The food manufacturing and processing industries in every country should align their objectives and processes in accordance with the changing needs of the societies.

II. Wealthier societies tend to incur great loss of calories of food materials due to indirect utilization of their agricultural produce.

Which of the above assumptions is/are valid?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*b*)

Assumption I is incorrect: The passage does not mention or imply anything about the objectives or processes of food manufacturing and processing industries needing alignment with societal changes. This assumption goes beyond the information provided.

Assumption II is correct: The passage clearly shows that in wealthier societies, indirect utilization of agricultural produce (through feeding animals) results in significant calorie loss, supporting this assumption.

5. What is the maximum value of n such that 7 × 343 × 385 × 1000 × 2401 × 77777 is divisible by 35^n?

(*a*) 3 (*b*) 4 (*c*) 5 (*d*) 7

Ans: (*b*)

We can write $35^n = (5 \times 7)^n$

We can write, $7 \times 343 \times 385 \times 1000 \times 2401 \times 77777$

$= 7 \times 7^3 \times (5 \times 7 \times 11) \times (5^3 \times 8) \times 7^4 \times (7 \times 11111)$

$= 7^{10} \times 5^4 \times 11 \times 8 \times 11111$

We can see that number of 7s is more than number of 5s

So, the value of 'n' will depend upon the number of 5

Since, number of 5s = 4

So, maximum value of n = 4

6. What is X in the sequence 24, X, 12, 18, 36, 90?

(*a*) 18 (*b*) 12 (*c*) 9 (*d*) 6

Ans: (*b*)

The given series follows the pattern as:

$24 \times 0.5 = 12$

$12 \times 1 = 12 = X$

$12 \times 1.5 = 18$

$18 \times 2 = 36$

$36 \times 2.5 = 90$

7. P and Q walk along a circular track. They start at 5:00 a.m. from the same point in opposite directions. P walks at an average speed of 5 rounds per hour and Q walks at an average speed of 3 rounds per hour. How many times will they cross each other between 5:20 a.m. and 7:00 a.m.?

(*a*) 12 (*b*) 13 (*c*) 14 (*d*) 15

Ans: (*b*)

Relative speed of 'P' with respect to 'Q' = 5 + 3 = 8 rounds per hour (Since, they are moving in opposite directions)

So, time after which they meet = $\frac{60}{8} = 7.5$ i.e. 7 minutes 30 seconds

So, they will cross each other after 7 minutes 30 seconds.

So, the instances they cross each other between 5:00 a.m. and 7:00 am are:

5:7:30, 5:15:00, 5:22:30, 5:30:00, 5:37:30, 5:45:00, 5:52:30, 6:00, 6:7:30, 6:15:00, 6:22:30, 6:30:00, 6:37:30, 6:45:00, 6:52:30 and 7:00

Since, we have to consider the scenario between 5:20 a.m. and 7:00 a.m. so we cannot take instances 5:7:30, 5:15:00 and 7:00 (as they will cross after 7 o'clock and not exactly at 7 o'clock)

So, we have 13 such instances.

Alternate Solution:

Relative speed of 'P' with respect to 'Q' = 5 + 3 = 8 rounds per hour (Since, they are moving in opposite directions)

So, they will meet in 8 times in 60 minutes

Since, the time between 5:20 a.m. and 7:00 a.m. = 40 + 60 = 100 minutes.

So, the number of times they will meet in 100 minutes $= 8 \times \frac{100}{60} \sim 13.33$

8. If P = +, Q = –, R = ×, S = ÷, then insert the proper notations between the successive numbers in the equation 60_15_3_20_4 = 20:

(*a*) SPRQ (*b*) QRPS (*c*) QRSP (*d*) SPQR

Ans: (*b*)

Going through options, we have;

For option (a) : SPRQ i.e. ÷, +, × and –

$60 \div 15 + 3 \times 20 - 4 = 4 + 60 - 4 = 60 \neq 20$

So, option (a) is not correct.

For option (b) : QRPS i.e. –, ×, + and ÷

$60 - 15 \times 3 + 20 \div 4 = 60 - 45 + 5 = 20$

So, option (b) is correct.

9. A tram overtakes 2 persons X and Y walking at an average speed of 3 km/hr and 4 km/hr in the same direction and completely passes them in 8 seconds and 9 seconds respectively. What is the length of the tram?

(*a*) 15 m (*b*) 18 m (*c*) 20 m (*d*) 24 m

Ans: (*c*)

Let speed of tram be 's' km/h and length of the tram be 'l' metres

According to question

The tram overtakes 'X' in 8 seconds

So, $l = (s - 3) \times \frac{5}{18} \times 8$ ...(*i*)

Also, the tram overtakes 'Y' in 9 seconds

So, $l = (s - 4) \times \frac{5}{18} \times 9$ ...(*ii*)

Equating equations (i) and (ii), we have

$(s - 3) \times \frac{5}{18} \times 8 = (s - 4) \times \frac{5}{18} \times 9$

Or, $8s - 24 = 9s - 36$

Or, $s = 36 - 24 = 12$

So, length of tram = $(s - 3) \times \frac{5}{18} \times 8$

$= (12 - 3) \times \frac{5}{18} \times 8 = 9 \times \frac{5}{18} \times 8 = 20$ metres

10. If N^2 = 12345678987654321, then how many digits does the number N have?

(*a*) 8 (*b*) 9 (*c*) 10 (*d*) 11

Ans: (*b*)

We know that

11^2 = 121; number of digits = 2

111^2 = 12321; number of digits = 3

1111^2 = 1234321; number of digits = 4

11111^2 = 123454321; number of digits = 5

Similarly, following the same pattern

111111111^2 = 12345678987654321; number of digits = 9

Alternate Solution:

If a number have 'n' digits then number of digits in its square can be either '2n' or (2n – 1)

Number of digits in the given expression = 18

So, here either 2n = 18 or 2n – 1 = 18

So, either n = 9 or n = 9.5 (not possible)

So, 'N' will have 9 digits

Directions for the following 4 (four) items:

Read the following two passages and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage - 1

One of the dismal realities of the agricultural sector in independent India has been that it never experienced a high-growth phase, unlike the non-agricultural economy. The highest decadal growth (compound annual growth rate or CAGR) for agriculture has been just 3.5% in the 1980s. Also, after experiencing a spurt in decadal growth during the 1980s, agricultural growth suffered relative stagnation thereafter. This is in sharp contrast to non-agricultural growth, which consistently increased from the 1980s to 2000s.

11. Which one of the following statements best reflects the corollary to the above passage?

(*a*) The benefit of economic reforms percolates down more slowly to the agriculture sector than in other sectors of the economy.

(*b*) For India, the green revolution was not as useful as it was expected to be.

(*c*) India lagged behind other countries in adapting mechanized and modern farming.

(*d*) Rural-to-urban migration resulted in the stagnant agriculture sector.

Ans: (*a*)

Option (*a*) is correct: The passage implies that economic growth and reforms benefit agriculture more slowly compared to other sectors, resulting in relative stagnation after the initial growth spurt in the 1980s.

Option (*b*) is incorrect: The passage does not specifically comment on the success or failure of the Green Revolution.

Option (*c*) is incorrect: The passage does not discuss mechanization or modernization directly.

Option (*d*) is incorrect: The passage does not mention rural-to-urban migration as a cause for stagnation in agriculture.

12. With reference to the passage, the following assumptions have been made:

The growing divergence between the fortunes of the agricultural and non-agricultural economy in India could have been reduced/contained by:

I. adapting large-scale cultivation of commercial crops and viable corporate farming.

II. providing free insurance for all crops and heavily subsidizing seeds, fertilizers, electricity and farm machinery at par with developed countries.

Which of the above assumptions is/are valid?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*d*)

Assumption I is incorrect: The passage does not discuss or imply that **large-scale commercial cultivation or corporate farming** would have reduced the divergence between agricultural and non-agricultural growth.

Assumption II is incorrect: The passage does not mention **free insurance, subsidies on seeds, fertilizers, or machinery** as methods to contain the divergence, nor does it compare India's policies with developed countries.

Passage - 2

In our country, handlooms are equated with a culture that ensures a continuity of tradition. This idea has become part of the public policy-framing and provides a legitimate basis for the State to support the sector. But the notion of tradition as a single, linear entity is being strongly contested today. The narratives dominant in defining culture/tradition in a particular way are seen to have emerged as the identities and histories of large sections. The discounted and, at times, forcibly stifled identities are fighting for their rightful place in history. Against this backdrop, when we promote handloom as a traditional industry, it is not surprising that large sections of our population choose to ignore it.

13. Which one of the following statements best reflects the most logical and rational message conveyed by the author of the passage?

(*a*) We need to free the handloom industry from the limited narrative linked to preserving cultural heritage.

(*b*) Continued State support to the handloom industry ensures the preservation of some of our glorious art forms and old traditions.

(*c*) Household units of the handloom sector should be modernized and made an economically viable organized industry.

(*d*) Handloom products need to be converted to machine-made designer products so as to make them more popular.

Ans: (*a*)

Option (*a*) is correct: The passage suggests rethinking handlooms beyond just tradition and opening them up to new ideas.

Option (*b*) is incorrect: The author questions the narrow view of handlooms as merely a cultural tradition, not suggesting that state support will preserve old traditions.

Option (*c*) is incorrect: The passage does not focus on modernizing handloom units or turning them into an organized industry, but rather on changing how we view and support handlooms.

Option (*d*) is incorrect: The passage does not suggest machine-made products; it's about rethinking the tradition of handlooms, not changing their nature.

14. With reference to the above passage, the following assumptions have been made:

I. There is no need for the State to be involved in any manner in the handloom sector.

II. Handloom products are no longer appealing and attractive in the rapidly changing modern world.

Which of the above assumptions is/are valid?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*d*)

Assumption I is incorrect: The passage does not suggest that **State involvement in the handloom sector should end**; rather, it critiques the **narrow cultural narrative** underpinning current support.

Assumption II is incorrect: The passage notes that some sections of the population may ignore handlooms due to the limited narrative but does **not state that handloom products themselves are unappealing or unattractive**.

15. Consider the first 100 natural numbers. How many of them are not divisible by any one of 2, 3, 5, 7 and 9?

(*a*) 20 (*b*) 21 (*c*) 22 (*d*) 23

Ans: (*c*)

Since, the numbers are not divisible by 2, 3, 5, 7 and 9.

So, the numbers can be 1 and the prime numbers between 1 to 100, excluding 2, 3, 5 and 7.

So, the required numbers are 1, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97 i.e. 22 numbers

16. If $4 \le x \le 8$ and $2 \le y \le 7$, then what is the ratio of maximum value of (x + y) to minimum value of (x – y)?

(*a*) 6 (*b*) $\frac{15}{2}$

(*c*) $-\frac{15}{2}$ (*d*) None of the above

Ans: (*d*)

The values 'x' can take are 4, 5, 6, 7 and 8

The values 'y' can take are 2, 3, 4, 5, 6 and 7

So, maximum value of (x + y) = 8 + 7 = 15

And, minimum value of (x – y) = 4 – 7 = –3

Required ratio = $\frac{15}{-3} = -5$

17. Let both p and k be prime numbers such that (p^2 + k) is also a prime number less than 30. What is the number of possible values of k?

(*a*) 4 (*b*) 5 (*c*) 6 (*d*) 7

Ans: (*b*)

The possible values of (p^2 + k) are 2, 3, 5, 7, 11, 13, 17, 19, 23 and 29.

(p^2 + k) cannot be 2, 3 or 5.

If (p^2 + k) = 7

We can take p = 2 and k = 3

If (p^2 + k) = 11

We can take p = 2 and k = 7, p = 3 and k = 2

If (p^2 + k) = 13: No possible values of 'p' and 'k' can be obtained.

If (p^2 + k) = 17

We can take p = 2 and k = 13

If (p^2 + k) = 19: No possible values of 'p' and 'k' can be obtained.

If (p^2 + k) = 23

We can take p = 2 and k = 19

If (p^2 + k) = 29; No possible values of 'p' and 'k' can be obtained.

So, possible values of 'k' are: 3, 7, 2 and 13 and 19 i.e. 5 values

18. There are n sets of numbers each having only three positive integers with LCM equal to 1001 and HCF equal to 1. What is the value of n?

(*a*) 6 (*b*) 7

(*c*) 8 (*d*) More than 8

Ans: (*d*)

Given, LCM = 1001 and HCF = 1

We know that 1001 = 7 × 11 × 13

So, the sets can be:

(7,11,13), (1,1,1001), (1,7,143), (1,77,13), (1,11,91), (7,11,91), (11,13,77), (7, 11, 143), (1, 77, 91) and so on

19. Let PQR be a 3-digit number, PPT be a 3-digit number and PS be a 2-digit number, where P, Q, R, S, T are distinct non-zero digits. Further, PQR – PS = PPT. If Q = 3 and T < 6, then what is the number of possible values of (R, S)?

(*a*) 2 (*b*) 3

(*c*) 4 (*d*) More than 4

Ans: (*b*)

We can write, PQR – PS = PPT as follows:

100P + 10Q + R – (10P + S) = 100P + 10P + T

Or, 10Q + R – 10P – S = 10P + T

Or, 10 × 3 + R – S = 10P + 10P + T [Since, Q = 3]

Or, 30 + R – S = 20P + T

Or, R + 30 = S + T + 20P

Since, maximum value that 'R', 'S' and 'T' can take is 9

So, maximum value of R + 30 will be 39

Thus, the only possible value of 'P' will be 1

So, the equation becomes

R + 30 = S + T + 20 × 1

Or, R + 30 = S + T + 20

Or, R + 10 = S + T

Now, we are given that 'P', 'Q', 'R', 'S' and 'T' are distinct non-zero digits and T < 6

So, the values 'T' can take are 2, 4 and 5

Case 1: T = 2

R + 10 = S + 2

Or, S – R = 10 – 2 = 8

Now, the digits left are 4, 5, 6, 7, 8 and 9. But none of the two digits will end in a difference of 8.

So, this case is invalid.

Case 2: T = 4

R + 10 = S + 4

Or, S – R = 10 – 4 = 6

Now, the digits left are 2, 5, 6, 7, 8 and 9.

Since, 8 – 2 = 6

So, S = 8 and R = 2 is possible

Case 3: T = 5

R + 10 = S + 5

Or, S – R = 10 – 5 = 5

Now, the digits left are 2, 4, 6, 7, 8 and 9.

Since, 7 – 2 = 5 and 9 – 4 = 5

So, S = 7 & R = 2 and S = 9 & R = 4 is possible

Thus, (R, S) can be (8, 2), (7, 2) and (9, 4)

20. Consider the sequence AB_CC_A_BCCC_BBC_C that follows a certain pattern. Which one of the following completes the sequence?

(*a*) B, C, B, C, A (*b*) A, C, B, C, A

(*c*) B, C, B, A, C (*d*) C, B, B, A, C

Ans: (*c*)

Since, there are 18 letters. Let us break them in group of 6 letters.

AB_CC_ / A_BCCC / _BBC_C

Now, putting the letters given in option (*c*) in the blank spaces we get;

AB**B**CC**C** / A**B**BCCC / **A**BBC**C**C, which follows a certain pattern.

Directions for the following 4 (four) items:

Read the following two passages and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage - 1

Each State in India faces a distinctive set of challenges regarding the impact of warming, but also offers its own set of opportunities for reducing emissions depending on its natural resources. For example, coastal States need to take action to protect their shores from sea level rise, districts that are drier need to prepare for variable monsoon precipitation. Himalayan regions have their own unique challenges, and selected parts of peninsular India and offshore areas offer great opportunities for harnessing wind power. These various aspects need to be considered for developing clear and sustainable goals for the future.

21. Which one of the following statements best reflects the most logical, rational and pragmatic message conveyed by the author of the passage?

(*a*) The mitigation and adaptation strategies to address/tackle the climate change is essentially the responsibility of each State.

(*b*) India is too diverse to implement any effective strategy or programme to address/tackle the climate change.

(*c*) It is basically the responsibility of the Union Government to implement the climate action plans and ensure net zero emissions.

(*d*) India needs to formulate effective climate change mitigation and adaptation strategies at the State/region level.

Ans: (*d*)

Option (*a*) is incorrect: Although the passage focuses on state-specific challenges and opportunities, it does not suggest that climate action is solely the responsibility of each state.

Option (*b*) is incorrect: The passage acknowledges diversity but does not suggest that this diversity makes effective climate action impossible.

Option (*c*) is incorrect: The passage does not indicate that climate action is the exclusive responsibility of the Union Government.

Option (*d*) is correct: The passage clearly supports the idea that climate change mitigation and adaptation strategies should be **formulated at the state or regional level**, taking into account the specific challenges and resources of each area.

22. With reference to the passage, the following assumptions have been made:

I. Green energy production can be linked to/integrated with the climate change mitigation and adaptation strategies.

II. Effects of climate change are much more severe in coastal and mountainous regions.

Which of the above assumptions is/are valid?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*a*)

Assumption I is correct: The passage explicitly mentions that parts of peninsular India and offshore areas offer opportunities for **harnessing wind power**, suggesting that **green energy production is integral** to climate change mitigation and adaptation strategies.

Assumption II is incorrect: The passage describes challenges faced by coastal and Himalayan regions but **does not state or compare** that the effects of climate change are **much more severe** in these areas relative to others. Therefore, the severity comparison implied in Assumption II is **not supported**.

Passage - 2

If the social inequality is the most acutely felt social problem in India, insecurity, more than poverty, is the most acutely felt economic problem. Besides those below the official poverty line, even those just over the poverty line are subject to multiple economic insecurities of various kinds (due to wealth and/or health risks, market fluctuations, job-related uncertainties). Many Government policies are actually intended towards mitigating these insecurities.

23. Which one of the following statements best reflects the critical message conveyed by the passage?

(*a*) India's political executive should be aware that poverty and social inequality and the consequent sense of insecurity is the main social problem.

(*b*) In India, poverty is the primary reason for social inequality and insecurity.

(*c*) Poverty and social inequality are so intricately linked that they pose an unmanageable crisis for India.

(*d*) Insecurity, more than poverty, is the main economic issue that Government policies must address.

Ans: (*d*)

Option (*a*) is incorrect: The passage does not specifically address the political executive or suggest they need to be made aware of these issues.

Option (*b*) is incorrect: The passage treats poverty and insecurity as distinct issues, with insecurity being more pressing economically, and does not state poverty is the primary cause of social inequality and insecurity.

Option (*c*) is incorrect: While the passage acknowledges the relationship between poverty and inequality, it does not describe it as an unmanageable crisis.

Option (*d*) is correct: The passage explicitly highlights that **insecurity, more than poverty, is the main economic issue** that government policies must address, making this the central message.

24. With reference to the above passage, the following assumptions have been made:

I. People above the poverty line also are prone to suffer from anxiety about economic insecurity.

II. Eradication of poverty can result in peace and social equality in the country.

Which of the above assumptions is/are valid?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*a*)

Assumption I is correct: The passage explicitly mentions that **those just over the poverty line** face multiple economic insecurities, supporting this assumption.

Assumption II is incorrect: The passage does not claim that **eradication of poverty alone** will result in peace and social equality; it highlights insecurity as a separate and pressing issue.

25. A solid cube is painted yellow on all its faces. The cube is then cut into 60 smaller but equal pieces by making the minimum number of cuts. Which of the following statements is/are correct?

I. The minimum number of cuts is 9.

II. The number of smaller pieces which are not painted on any face is 6.

Select the correct answer using the code given below:

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*c*)

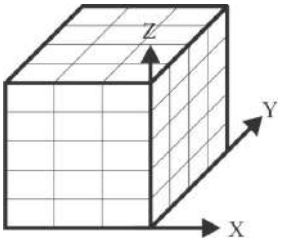
Since, we have to cut the solid cube into 60 smaller but equal pieces. So, we can divide x-axis in 3 parts, y-axis in 4 parts and z -axis in 5 parts.

For dividing x-axis in 3 parts, we have to make 2 (= 3 – 1) cuts

For dividing y-axis in 4 parts, we have to make 3 (= 4 – 1) cuts

For dividing z-axis in 5 parts, we have to make 4 (= 5 – 1) cuts

So, total number of cuts required = 2 + 3 + 4 = 9



So, statement I is correct.

Number of pieces which are not painted on any face = (2 – 1) × (3 – 1) × (4 – 1) = 1 × 2 × 3 = 6

So, statement II is also correct.

26. If 7 * 24 = 25 and 12 * 16 = 20, then what is 16 * 63 equal to?

(*a*) 70 (*b*) 66

(*c*) 65 (*d*) 64

Ans: (*c*)

We have, 7 * 24 = 25

And, $7^2 + 24^2 = 49 + 576 = 625 = 25^2$

Also, 12 * 16 = 20

And, $12^2 + 16^2 = 144 + 256 = 400 = 20^2$

Following the same pattern, we have

$16 * 63 = 16^2 + 63^2 = 256 + 3969 = 4225 = 65^2$

27. The petrol price shot up by 10% as a result of the hike in crude oil prices. The price of petrol before the hike was ₹ 90 per litre. A person travels 2200 km every month and his car gives a mileage of 16 km per litre. By how many km should he reduce his travel if he wants to maintain his expenditure at the previous level?

(*a*) 180 km (*b*) 200 km (c) 220 km (d) 240 km

Ans: (*b*)

Price of petrol before hike = Rs. 90

Price of petrol after 10% hike = 1.10 × 90 = Rs. 99

Quantity of petrol used per month = $\frac{2200}{16}$ = 137.5 litres

Expenditure on petrol before hike = 137.5 × 90 = Rs. 12375 = Expenditure on petrol after hike

So, quantity of petrol used per month after hike = $\frac{12375}{99}$ = 125 litres

So, distance travelled now = 125 × 16 = 2000 km

Reduction in travel = 2200 – 2000 = 200 km

28. A 4-digit number N is such that when divided by 3, 5, 6, 9 leaves a remainder 1, 3, 4, 7 respectively. What is the smallest value of N?

(*a*) 1068 (*b*) 1072 (*c*) 1078 (*d*) 1082

Ans: (*c*)

Since, 3 – 1 = 2, 5 – 3 = 2, 6 – 4 = 2 and 9 – 7 = 2

So, the required number = LCM of (3, 5, 6 and 9) × k – 2 [where 'k' is a natural number]

LCM of (3, 5, 6 and 9) = 90

So, the required number = 90k – 2

Putting k = 12, we get, 90k – 2 = 90 × 12 – 2 = 1080 – 2 = 1078

29. Consider the following statements:

I. If A ≤ B > C < D > E > F ≥ G = H; then B is always greater than E.

II. If P > Q = R ≥ S = T ≤ U = V > W; then S is always less than V.

Which of the statements given above is/are correct?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*d*)

From statement I, we have B > C < D > E

So, we cannot define a particular relation between B and E

So, statement I is not correct.

From statement II, we have S = T ≤ U = V

We can write it as

S = T < U = V or S = T = U = V

So, S ≤ V

So, statement II is not correct.

30. What is the unit digit in the multiplication of $1 \times 3 \times 5 \times 7 \times 9 \times ... \times 999$?

(*a*) 1 (*b*) 3 (*c*) 5 (*d*) 9

Ans: (*c*)

Since, the expression contains only odd numbers and 5s

So, the unit digit = 5 [As any combination of odd numbers multiplied by 5 will result in a number with unit digit 5]

Directions for the following 4 (four) items:

Read the following **two passages** and answer the items that follow the passages. Your answers to these items should be based on the passages only.

Passage - 1

Maintaining an ecosystem just to conserve biodiversity will affect its commercial potential as well as the livelihoods dependent on the ecosystem. There is also a conflict between using an ecosystem only for livelihoods, for commercial exploitation, or strictly for conservation. Deforestation caused due to commercial exploitation will lead to indirect harm like floods, siltation problems and microclimatic instability, apart from adversely affecting livelihoods dependent on forests. These conflicts are particularly acute in developing countries where the dependence of people on the ecosystem is significant, and commercial exploitation has the potential to boost national income.

31. Which one of the following statements best reflects the critical message conveyed by the author of the passage?

(*a*) Conservation of biodiversity is not an issue to be worried about when some people depend on ecosystems for their livelihoods.

(*b*) Commercial exploitation of forests goes against the fundamental rights of the people dependent on forests for food and shelter.

(*c*) Sustenance of livelihood and degradation of ecosystem while being together exacerbate one another, leading to conflicts and imbalance.

(*d*) Commercial exploitation of ecosystems should be completely stopped.

Ans: (*c*)

Option (*a*) is incorrect: The passage stresses that conservation is important despite livelihood dependence; it does not dismiss conservation concerns.

Option (*b*) is incorrect: Although commercial exploitation impacts livelihoods, the passage does not frame this as a violation of fundamental rights.

Option (*c*) is correct: The passage conveys that **livelihood sustenance and ecosystem degradation can coexist but worsen each other**, causing conflicts and imbalance—this is the core message.

Option (*d*) is incorrect: The passage recognizes the economic role of commercial exploitation and does not call for its complete cessation.

32. With reference to above passage, the following assumptions have been made :

I. No country needs to depend on ecosystems to boost national income.

II. Resource-rich countries need to share their resources with those of scant resources so as to prevent the degradation of ecosystems.

Which of the above assumptions is/are valid?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*d*)

Assumption I is incorrect: The passage implies that many developing countries **do depend on ecosystems** to boost national income, so the assumption that no country needs to do so contradicts the passage.

Assumption II is incorrect: The passage does **not mention or suggest** that resource-rich countries should share resources with resource-scarce countries to prevent ecosystem degradation.

Passage-2

The history of renewable energy suggests there is a steep learning curve, meaning that, as more is produced, costs fall rapidly because of economies of scale and learning by doing. The firms' green innovation is path-dependent: the more a firm does, the more it is likely to do in the future. The strongest evidence for this is the collapse in the price of solar energy, which became about 90% cheaper during the 2010s, repeatedly beating forecasts. Moving early and gradually gives economies more time to adjust, allowing them to reap the benefits of path-dependent green investment without much disruption. A late, more chaotic transition is costlier.

33. Which one of the following statements best reflects the central idea of the passage?

(*a*) Economies of scale is essential for transition to green growth.

(*b*) Modern technological progress is intensely linked to path-dependent innovations.

(*c*) Countries with large economies are in a better position to adopt green technologies.

(*d*) Timing plays a crucial role in the case of green technology development.

Ans: (*d*)

Option (*a*) is incorrect: While economies of scale contribute to cost reductions, the passage stresses more broadly the importance of timing and gradual transition rather than just economies of scale.

Option (*b*) is incorrect: Although path-dependent innovation is discussed, the passage focuses on the timing and smoothness of the transition as key for cost-effective green technology development.

Option (*c*) is incorrect: The passage does not mention the size of economies or imply that large economies are inherently better positioned to adopt green technologies.

Option (*d*) is correct: The passage underscores that **timing plays a crucial role**, advocating for early and gradual adoption to allow adjustment and the opportunity to reap benefits, making this the central idea.

34. With reference to the above passage, the following assumptions have been made:

I. Path-dependent green investments will eventually most likely benefit growth as well as public finances in a country like India.

II. If other green technologies follow the same pattern as that of solar energy, there will most likely be an easy green transition.

Which of the above assumptions is/are valid?

(*a*) I only (*b*) II only

(*c*) Both I and II (*d*) Neither I nor II

Ans: (*c*)

Assumption I is correct: The passage suggests that path-dependent green investments, such as those in renewable energy, help economies grow and improve public finances by reducing costs over time, which would apply to countries like India.

Assumption II is correct: The passage implies that if other green technologies experience similar steep learning curves and cost reductions as solar energy, then the transition to green technologies will be smoother and less costly.

35. A natural number N is such that it can be expressed as N = p + q + r, where p, q and r are distinct factors of N. How many numbers below 50 have this property?

(*a*) 6 (*b*) 7 (*c*) 8 (*d*) 9

Ans: (*c*)

Since, 'N' is the sum of its three distinct factors, it cannot be a prime number as prime numbers have only two factors.

Let N = 6

Factors of 6 are 1, 2, 3 and 6

And, 1 + 2 + 3 = 6

So, N = 6 is a possibility

Let N = 8

Factors of 8 are 1, 2, 4 and 8

But 8 cannot be expressed as a sum of its factors.

So, N = 8 is not a possibility.

So, carrying on in the same manner if we take N = 12

Factors of 12 = 1, 2, 3, 4, 6 and 12

And, 2 + 4 + 6 = 12

So, N = 12 is a possibility

Taking N = 18

Factors of 18 = 1, 2, 3, 6, 9 and 18

And, 3 + 6 + 9 = 18

So, N = 18 is a possibility

We can observe pattern that the number is a multiple of 6

So, possible values of 'N' are 6, 12, 18, 24, 30, 36, 42 and 48 i.e. 8 numbers

36. Three prime numbers p, q and r, each less than 20, are such that p – q = q – r. How many distinct possible values can we get for (p + q + r)?

(*a*) 4 (*b*) 5

(*c*) 6 (*d*) More than 6

Ans: (*d*)

Since, 'p', 'q' and 'r' are prime numbers which are less than 20 so the possible values of 'p', q' and 'r' can be among 2, 3, 5, 7, 11, 13, 17 and 19

If we take 'p', 'q' and 'r' to be either distinct or same then we have;

If p = q = r = 2, then p + q + r = 2 × 3 = 6

If p = q = r = 3, then p + q + r = 3 × 3 = 9

If p = q = r = 5, then p + q + r = 5 × 3 = 15

If p = q = r = 7, then p + q + r = 7 × 3 = 21

If p = q = r = 11, then p + q + r = 11 × 3 = 33

If p = q = r = 13, then p + q + r = 13 × 3 = 39

If p = q = r = 17, then p + q + r = 17 × 3 = 51

If p = q = r = 19, then p + q + r = 19 × 3 = 57

If q = 5, then p = 3 and r = 7 or vice versa but (p + q + r) = 3 + 5 + 7 = 15

If q = 7, then p = 3 and r = 11 or vice versa but (p + q + r) = 3 + 7 + 11 = 21

If q = 11, then p = 3 and r = 19 or vice versa but (p + q + r) = 3 + 11 + 19 = 33

If q = 11, then p = 5 and r = 17 or vice versa but (p + q + r) = 5 + 11 + 17 = 33

If q = 13, then p = 7 and r = 19 or vice versa but (p + q + r) = 7 + 13 + 19 = 39

Thus, distinct sum (p + q + r) are:

6, 9, 15, 21, 33, 39, 51 and 57 i.e. 8 distinct sums.

Thus, it is more than 6.

37. How many possible values of (p + q + r) are there satisfying $\frac{1}{p}+\frac{1}{q}+\frac{1}{r}=1$, , where p, q and r are natural numbers (not necessarily distinct)?

(*a*) None (*b*) One

(*c*) Three (*d*) More than three

Ans: (*c*)

This type of question can be solved with hit and trial method

If we take p = 2, then $\frac{1}{2}+\frac{1}{q}+\frac{1}{r}=1$

So, $\frac{1}{q}+\frac{1}{r}=1-\frac{1}{2}=\frac{1}{2}$

Here, we can take q = r = 4

So, $\frac{1}{q}+\frac{1}{r}=\frac{1}{4}+\frac{1}{4}=\frac{2}{4}=\frac{1}{2}$

So, p + q + r = 2 + 4 + 4 = 10

Also, we can take 'q' and 'r' can take any of 3 and 6

So, $\frac{1}{q}+\frac{1}{r}=\frac{1}{6}+\frac{1}{3}=\frac{3}{6}=\frac{1}{2}$

So, p + q + r = 2 + 3 + 6 = 11

If we take p = 3, then $\frac{1}{3}+\frac{1}{q}+\frac{1}{r}=1$

So, $\frac{1}{q}+\frac{1}{r}=1-\frac{1}{3}=\frac{2}{3}$

Here, we can take q = r = 3

So, $\frac{1}{q}+\frac{1}{r}=\frac{1}{3}+\frac{1}{3}=\frac{2}{3}$

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