

## Number Theory (Quantitative Aptitude) (ANSWERS)

SET

**A**

Questions: 36

Duration: 120min

**Question Text Array Format**

*This section demonstrates how the question\_text array creates line breaks, with each string value becoming a separate line when rendered.*

1. *During photosynthesis, plants absorb carbon dioxide from the atmosphere.  
They use sunlight energy to convert it into glucose.  
What gas is released as a byproduct of this process?*

- A. Hydrogen                      B. **Oxygen \***  
C. Carbon monoxide          D. Nitrogen

**Explanation:**

Photosynthesis converts carbon dioxide and water into glucose and oxygen using sunlight energy. Oxygen is released as a byproduct.

2. *This question demonstrates two-line formatting with separate strings.  
How many strings are in this question\_text array?*

- A. **2 strings \***                      B. 4 strings  
C. 1 string                          D. 3 strings

**Explanation:**

The question\_text array contains exactly 2 strings. Each string in the array represents a separate line when displayed.

3. *This question has one string in the question\_text array, creating a single line. How many strings are in this question\_text array?*

- A. 4 strings                      B. 3 strings  
C. 2 strings                      D. **1 string \***

**Explanation:**

The question\_text array contains exactly 1 string, which creates a single line display.

4. *This question demonstrates three-line formatting.  
The question\_text array has three string values.  
How many separate lines will be displayed when this question is rendered?*

- A. **3 lines \***                      B. 2 lines  
C. 1 line                          D. 4 lines

**Explanation:**

Since the question\_text array contains 3 strings, exactly 3 separate lines will be displayed when rendered, demonstrating the array-to-newline relationship.

5. *What is the chemical symbol for water?*

- A. O2                                  B. NaCl  
C. **H2O \***                          D. CO2

**Explanation:**

Water is composed of two hydrogen atoms and one oxygen atom, represented by the chemical formula H2O.

6. *A light ray travels from air into glass.  
What phenomenon occurs at the boundary?*

- A. **Both reflection and refraction \***          B. Refraction only  
C. Neither reflection nor refraction  
D. Reflection only

**Explanation:**

When light travels from one medium to another, part of it is reflected back and part is refracted (bent) as it enters the new medium.

**LIST Placeholder Format**

*This section demonstrates how the LIST placeholder in question\_text works with list\_items to display formatted lists.*

7.        a. World War II ends  
          b. Moon landing  
          c. Fall of Berlin Wall  
          d. Internet becomes public

*Order the above events in chronological order.*

- A. b → a → d → c                      B. **a → b → c → d \***  
C. d → b → a → c                      D. a → c → b → d

**Explanation:**

Chronological order: World War II ended in 1945, Moon landing occurred in 1969, Berlin Wall fell in 1989, and Internet became public in early 1990s.

8. *This question uses LIST placeholder to display items from list\_items array.*

Item 1: First list item

Item 2: Second list item

*How many items are in the list below?*

- A. 4 items                                  B. **2 items \***  
C. 3 items                                  D. 1 item

**Explanation:**

The list\_items array contains exactly 2 items, which are displayed when LIST placeholder is used in question\_text.

9. Which of the following are states of matter?

- i. Solid
- ii. Liquid
- iii. Gas
- iv. Plasma

- A. i and iii only
- B. i, ii, and iii only
- C. i and ii only
- D. **All of the above \***

**Explanation:**

Solid, liquid, gas, and plasma are all recognized states of matter in physics.

10. This question shows intro-text, LIST, question-text structure with three parts.

- Part 1: Introduction text
- Part 2: List items displayed here
- Part 3: Question text after the list

What pattern does this question demonstrate?

- A. question-LIST-intro structure
- B. intro-question-LIST structure
- C. **intro-LIST-question structure \***
- D. LIST-intro-question structure

**Explanation:**

The question\_text array has introduction text, then LIST placeholder, then question text, demonstrating the intro-LIST-question structure.

11. Consider the following steps to solve a linear equation:

- A. Subtract 5 from both sides
- B. Divide both sides by 2
- C. Check the solution

What is the correct order to solve  $2x + 5 = 15$ ?

- A. C → A → B
- B. **A → B → C \***
- C. B → A → C
- D. A → C → B

**Explanation:**

To solve  $2x + 5 = 15$ : first subtract 5 to get  $2x = 10$ , then divide by 2 to get  $x = 5$ , then check by substituting back.

**STATEMENT/STATEMENTS Placeholder Format**

This section demonstrates STATEMENT placeholder (rare case for single statement) and STATEMENTS placeholder (common case for multiple statements) usage with statements array.

12. **Statement:**

Objects with greater mass exert stronger gravitational force on other objects.

Evaluate the scientific accuracy of the statement above.

Is this statement about gravitational force correct?

- A. False - mass does not affect gravitational force
- B. Partially true - only applies to planets
- C. **True - the statement is scientifically accurate \***
- D. Cannot be determined from given information

**Explanation:**

According to Newton's law of universal gravitation, gravitational force is directly proportional to the masses of the objects involved, making this statement scientifically accurate.

13. This question uses STATEMENTS placeholder (not STATEMENT) with multiple statements.

**Statement I:**

This is the first roman numeral statement in the array.

**Statement II:**

This is the second roman numeral statement in the array.

How many roman numeral statements are shown above?

- A. 1 statement
- B. **2 statements \***
- C. No statements
- D. 3 statements

**Explanation:**

The statements array contains exactly 2 statements labeled as Statement I and Statement II.

14. This question demonstrates multiple text blocks around STATEMENTS placeholder.

The structure is: text, text, STATEMENTS, text.

**Example Statement:**

There are text blocks before and after the STATEMENTS placeholder.

**Structure Note:**

This creates a more complex question format with multiple parts.

**Usage Info:**

You can have up to 3 or more statements in the statements array.

How many text blocks surround the STATEMENTS placeholder in this question?

- A. 2 text blocks (before only)      B. 4 text blocks total only)  
C. 1 text block (after only)  
D. **3 text blocks (2 before, 1 after) \***

**Explanation:**

The question\_text has 2 text blocks before STATEMENTS and 1 text block after, making 3 text blocks total surrounding the placeholder.

15. **Statement:**

The STATEMENT placeholder gets replaced with one statement from the statements array during rendering.

This question uses STATEMENT placeholder for a single statement (rare case).

How does the STATEMENT placeholder work?

- A. It creates a numbered list  
B. **It displays single statement content \***  
C. It hides the statement text  
D. It shows only the label

**Explanation:**

The STATEMENT placeholder in question\_text gets replaced with the labeled text from the statements array when the question is rendered for single statement usage.

16. Consider the following statements about the water cycle:

**Statement I:**

Water evaporates from oceans, lakes, and rivers due to solar energy.

**Statement II:**

Condensation occurs when water vapor cools and forms droplets in clouds.

Which statements are correct?

- A. Neither statement      B. Statement II only  
C. Statement I only  
D. **Both Statement I and Statement II \***

**Explanation:**

Statement I correctly describes evaporation driven by solar energy, and Statement II accurately explains condensation as water vapor cooling to form cloud droplets.

17. In biological systems, photosynthesis is a crucial process.

Consider the relationship between light and this process:

**Assertion (A):**

Light energy is essential for photosynthesis to occur.

**Reasoning (R):**

Chlorophyll absorbs light energy to convert CO<sub>2</sub> and water into glucose and oxygen.

**Inference (I):**

Without adequate light, plants cannot produce food through photosynthesis.

Evaluate the correctness of the assertion, reasoning, and inference.

- A. A is wrong, R is correct, I is correct  
B. A is wrong, R is wrong, I is correct  
C. All are wrong  
D. A is correct, R is wrong, I is correct  
E. A is correct, R is correct, I is wrong  
F. **A is correct, R is correct, I is correct \***

**Explanation:**

The assertion correctly states light is essential for photosynthesis, the reasoning accurately explains the chlorophyll mechanism, and the inference logically follows that without light, photosynthesis cannot occur.

### PARAGRAPH Placeholder Format

This section demonstrates how the PARAGRAPH placeholder in question\_text works with paragraph field to display short paragraph content.

18. This question shows intro-text, PARAGRAPH, question-text structure.

The PARAGRAPH placeholder is positioned between introduction and question text, creating a three-part structure.

What pattern does this question demonstrate?

- A. question-PARAGRAPH-intro structure  
B. PARAGRAPH-intro-question structure  
C. **intro-PARAGRAPH-question structure \***  
D. intro-question-PARAGRAPH structure

**Explanation:**

The question\_text array has introduction text, then PARAGRAPH placeholder, then question text, demonstrating the intro-PARAGRAPH-question structure.

19. Read the statement about chemical reactions:

Chemical reactions need activation energy to proceed.

What is required for reactions to occur?

- A. High pressure      B. Low temperature  
C. Presence of water      D. **Activation energy \***

**Explanation:**

The paragraph directly mentions that chemical reactions need activation energy to proceed.

## 20. Read the following passage about climate change:

Climate change refers to long-term shifts in global weather patterns and temperatures. Since the Industrial Revolution, human activities have dramatically increased the concentration of greenhouse gases in Earth's atmosphere, particularly carbon dioxide from burning fossil fuels, deforestation, and industrial processes.

These greenhouse gases trap heat from the sun, causing global temperatures to rise at an unprecedented rate. Scientists have concluded that human activities are the primary driver of climate change observed since the mid-20th century, with natural climate variations playing a much smaller role.

What is identified as the primary driver of current climate change?

- A. Solar radiation changes
- B. **Human activities and greenhouse gas emissions \***
- C. Natural climate variations
- D. Deforestation only

**Explanation:**

The passage clearly states that human activities are the primary driver of climate change, particularly through increasing greenhouse gas concentrations from fossil fuel burning and other activities.

## 21. This question demonstrates using \n characters within paragraph text to create line breaks.

This is line 1 of the paragraph.  
This is line 2 of the paragraph.  
This is line 3 of the paragraph.

How many lines are displayed in the paragraph above?

- A. 2 lines
- B. **3 lines \***
- C. 4 lines
- D. 1 line

**Explanation:**

The \n characters in the paragraph field create line breaks, resulting in 3 separate lines of text within the paragraph block.

## 22. This question uses PARAGRAPH placeholder to display content from paragraph field.

The PARAGRAPH placeholder gets replaced with the text from the paragraph field during rendering.

How does the PARAGRAPH placeholder work?

- A. It shows only formatted text
- B. **It displays the paragraph field content \***
- C. It creates multiple paragraphs
- D. It hides the paragraph text

**Explanation:**

The PARAGRAPH placeholder in question text gets replaced with the text from the paragraph field when the question is rendered.

## 23. Consider the following information about ecosystems:

Decomposers are vital organisms in ecosystems that break down dead organic matter from plants and animals. They include bacteria, fungi, and certain insects that feed on decaying material. Through their metabolic processes, they decompose complex organic compounds and return essential nutrients like nitrogen, phosphorus, and carbon back to the soil, making these nutrients available for uptake by living plants and continuing the nutrient cycle.

What role do decomposers play in ecosystems?

- A. They control population sizes of other species
- B. They provide energy directly to consumers
- C. They produce oxygen for other organisms
- D. **They recycle nutrients back to the ecosystem \***

**Explanation:**

The paragraph explains that decomposers break down dead matter and return nutrients to soil, which is the process of recycling nutrients in ecosystems.

**MTF (Match The Following) Placeholder Format**

This section demonstrates how the MTF DATA placeholder in question\_text works with mtf\_data object to display match-the-following questions with left and right columns.

24. Chemical Elements	- Atomic Numbers
Hydrogen	- 2
Helium	- 1
Lithium	- 4
Beryllium	- 3

How many of the above are correctly matched?

- A. **0 correctly matched \***
- B. 1 correctly matched
- C. 2 correctly matched
- D. 3 correctly matched

**Explanation:**

The correct atomic numbers are: Hydrogen-1, Helium-2, Lithium-3, Beryllium-4. In the given data: Hydrogen is matched with 2 (wrong), Helium with 1 (wrong), Lithium with 4 (wrong), and Beryllium with 3 (wrong). None are correctly matched.

25. *This question demonstrates intro-text, MTF\_DATA, question-text structure.*

Structure Parts	-	Descriptions
a. Part 1	-	Question text after MTF_DATA
b. Part 2	-	Introduction text before MTF_DATA
c. Part 3	-	MTF_DATA placeholder in middle

*What pattern does this question demonstrate?*

- A. MTF\_DATA-intro-question structure  
 B. question-MTF\_DATA-intro structure  
 C. intro-question-MTF\_DATA structure  
 D. **intro-MTF\_DATA-question structure \***

**Explanation:**

The question\_text array has introduction text, then MTF\_DATA placeholder, then question text, demonstrating the intro-MTF\_DATA-question structure.

26. *Match the chemical elements with their symbols:*

Elements	-	Chemical Symbols
i. Sodium	-	a. Ca
ii. Potassium	-	b. Na
iii. Calcium	-	c. Mg
iv. Magnesium	-	d. K

*Which option shows the correct matching?*

- A. **i-b, ii-d, iii-a, iv-c \***      B. i-c, ii-a, iii-d, iv-b  
 C. i-a, ii-c, iii-b, iv-d      D. i-d, ii-b, iii-c, iv-a

**Explanation:**

Sodium has symbol Na, Potassium has K, Calcium has Ca, and Magnesium has Mg based on their Latin names.

27. *This question uses MTF\_DATA placeholder to display match-the-following content from mtf\_data object.*

Example Left Column	-	Example Right Column
a. Left Item 1	-	Right Item 1
b. Left Item 2	-	Right Item 2

*How does the MTF\_DATA placeholder work?*

- A. **It displays the mtf\_data object content in two columns \***  
 B. It creates a single list  
 C. It shows only the headers  
 D. It hides the matching data

**Explanation:**

The MTF\_DATA placeholder in question\_text gets replaced with the formatted left and right columns from the mtf\_data object when the question is rendered.

Planets	-	Distance from Sun (million km)
Mercury	-	227.9
Venus	-	57.9
Earth	-	149.6
Mars	-	108.2

*Which planet is closest to the Sun according to the data above?*

- A. Mars      B. Earth  
 C. Venus      D. **Mercury \***

**Explanation:**

According to the data, Mercury has the shortest distance from the Sun at 57.9 million km, making it the closest planet to the Sun.

### Mixed Placeholder Combinations

*This section demonstrates using multiple placeholders together in a single question, showing various combinations like PARAGRAPH + LIST, STATEMENTS + PARAGRAPH, etc.*

29. *Study the research data:*

Study Groups	-	Success Rate (%)
Group A	-	85
Group B	-	72
Group C	-	91

*Read the analysis:*

The data shows varying success rates across different study groups. Group C demonstrated the highest performance, likely due to enhanced preparation methods and consistent practice schedules implemented throughout the study period.

*Based on both the data and analysis, what conclusion can be drawn?*

- A. The data is insufficient to draw conclusions  
 B. Group A performed best overall  
 C. All groups performed equally well  
 D. **Group C had the most effective study methods \***

**Explanation:**

The MTF data shows Group C with the highest success rate (91%), and the paragraph analysis confirms this was due to enhanced preparation methods, supporting the conclusion about their effectiveness.

30. Read the background information:

Climate change requires immediate action through renewable energy adoption. The primary challenge is transitioning from fossil fuel dependency while maintaining economic stability.

Consider the following options:

- a. Increase coal production
- b. Invest in solar and wind energy
- c. Ignore environmental concerns
- d. Wait for future technology

Which option best addresses the main concern mentioned in the paragraph?

- A. Option c
- B. Option d
- C. **Option b \***
- D. Option a

**Explanation:**

The paragraph emphasizes the need for renewable energy adoption to address climate change, making solar and wind energy investment (option b) the best choice.

31. Statement I:

Regular exercise improves cardiovascular health.

Statement II:

Proper nutrition supports muscle recovery.

Based on the statements above:

- 1. Statement I + Daily cardio routine
- 2. Statement II + Protein-rich diet
- 3. Both statements + Comprehensive fitness plan
- 4. Neither statement + Sedentary lifestyle

Which combination of statement and action is most appropriate?

- A. Option 2 only
- B. Option 1 only
- C. **Option 3 (comprehensive approach) \***
- D. Option 4 (no action needed)

**Explanation:**

Both statements are scientifically accurate, so a comprehensive fitness plan that combines cardio exercise and proper nutrition (option 3) addresses both statements effectively.

32. Analyze the following scenario:

A company's quarterly sales dropped by 15% compared to the previous quarter. The marketing budget was reduced by 30% during the same period, while competitor spending increased by 20%.

Evaluate these statements:

**Assertion (A):**

Reduced marketing budget contributed to the sales decline.

**Reasoning (R):**

Marketing investment directly correlates with brand visibility and customer acquisition.

What is the most logical conclusion?

- A. Both A and R are correct, R doesn't explain A
- B. A is correct, R is incorrect
- C. Both A and R are incorrect
- D. **Both A and R are correct, R explains A \***

**Explanation:**

The assertion correctly identifies reduced marketing budget as a contributing factor to sales decline, and the reasoning properly explains the relationship between marketing investment and sales performance, especially given the competitive context.

33. This question demonstrates PARAGRAPH + LIST combination usage.

This paragraph provides context before the list items are displayed.

- i. First list item after paragraph
- ii. Second list item
- iii. Third list item

How many placeholders are used in this question structure?

- A. **2 placeholders (PARAGRAPH + LIST) \***
- B. 3 placeholders including text
- C. No placeholders used
- D. 1 placeholder (PARAGRAPH only)

**Explanation:**

This question uses both PARAGRAPH placeholder (replaced with paragraph field content) and LIST placeholder (replaced with list\_items array), demonstrating mixed placeholder usage.

34. Review the following research findings:

Recent studies on sleep deprivation show significant impacts on cognitive function, memory consolidation, and emotional regulation. Participants with less than 6 hours of sleep showed 40% reduced problem-solving ability and increased stress hormone levels.

Match the findings with their implications:

<b>Sleep Duration</b>	-	<b>Primary Effect</b>
Less than 6 hours	-	Optimal cognitive function
6-7 hours	-	Reduced problem-solving ability
8+ hours	-	Moderate cognitive performance

How many matches are scientifically accurate?

A. 3 matches are accurate  
B. 2 matches are accurate  
C. **1 match is accurate** \*  
D. 0 matches are accurate

**Explanation:**  
Based on the paragraph, less than 6 hours should match with 'Optimal cognitive function', 6-7 hours with 'Reduced problem-solving ability', and 8+ hours with 'Moderate cognitive performance'. Only the middle pairing is correctly matched in the given data.

35. Consider the following experimental conditions:

α. Temperature increased to 25°C  
β. pH maintained at 7.0  
γ. Light exposure for 12 hours daily  
δ. Nutrient solution concentration doubled

Evaluate the hypothesis:

**Hypothesis (H):**  
Plant growth rate increases with optimal light exposure.

**Reasoning (R):**  
Photosynthesis efficiency directly depends on adequate light availability.

Which experimental condition best supports the reasoning provided?

A. Condition α (temperature)  
B. **Condition γ (light exposure)** \*  
C. Condition δ (nutrients)  
D. Condition β (pH)

**Explanation:**  
The hypothesis focuses on light exposure's effect on plant growth, and the reasoning explains this through photosynthesis efficiency. Condition γ (12 hours daily light exposure) directly tests this relationship.

36. Examine the business case study:

TechCorp's market share declined from 25% to 18% over two years. Competitor analysis reveals that rivals invested heavily in AI-powered features while TechCorp focused on cost reduction. Customer feedback indicates demand for innovative solutions over price cuts.

Consider these strategic options:

I. Reduce prices further  
II. Invest in AI technology  
III. Maintain current strategy  
IV. Exit the market

Evaluate the following analysis:

**Strategic Analysis (S):**  
Investment in innovation aligns with customer demand and competitive trends.

**Market Reality (M):**  
Price reduction strategy failed to prevent market share loss.

Which combination of option and reasoning is most sound?

A. **Option II + Both S and M** \*  
B. Option III + Analysis M  
C. Option IV + Neither S nor M  
D. Option I + Analysis S

**Explanation:**  
The paragraph shows that AI investment by competitors succeeded while cost reduction failed. Option II (invest in AI) aligns with both the strategic analysis about innovation demand and the market reality about price reduction failure.

\* \* \* \* **END** \* \* \* \*