

Msc

Climate and Sustainability (20 Questions)

1. What is the best definition of sustainability based on the given description?
 - A. A method of conserving resources to ensure economic growth.
 - B. An approach to life that causes the least possible harm to the natural world or living organisms.
 - C. A system designed to exploit natural resources for human benefit.
 - D. A policy aimed at supporting industrial development regardless of environmental impact.
-

2. Which of the following best represents the **three pillars of sustainability**?

- A) Economic growth, technological innovation, and resource extraction.
- B) Environmental conservation, economic growth, and social equity.
- C) Renewable energy, carbon trading, and climate action.
- D) Environmental policies, financial investments, and industrial development.

Correct Answer:

- B) Environmental conservation, economic growth, and social equity.
-

3. What are the Sustainable Development Goals (SDGs)?

1. A set of goals aimed at addressing the world's most important challenges by 2030.
2. Goals focused solely on economic growth and industrialization.
3. Goals related to ending poverty, providing education, protecting life, addressing inequalities, and tackling climate change.
4. A framework to support unlimited exploitation of natural resources.

Choose the best option:

- A. Both 1 and 2
 - B. only 4
 - C. only 3
 - D. Both 1 and 3
-

4. Choose the options that correctly differentiate between ESG and sustainability?
 1. ESG stands for environment, social, and governance and is specific and measurable.

2. Sustainability is a broader and less tangible concept compared to ESG.
3. ESG focuses only on environmental issues, while sustainability includes social and economic factors.
4. Companies use ESG criteria to make measurable decisions to become greener, more ethical, and better governed.
- A. 1 and 2
 - B. 2 and 3
 - C. 1, 3 and 4
 - D. 1, 2 and 4
-

5. Which of the following sets of gases includes a gas that is NOT considered a greenhouse gas?
- A) Methane (CH_4) and Nitrous oxide (N_2O)
 - B) Carbon dioxide (CO_2) and Oxygen (O_2)
 - C) Water vapor (H_2O) and Ozone (O_3)
 - D) Methane (CH_4) and Carbon dioxide (CO_2)
-

6. Which part of the electromagnetic spectrum contributes to the greenhouse effect?
- A) Ultraviolet
 - B) Visible
 - C) Infrared
 - D) X-rays
-

7. Which climate phenomenon, driven by changes in atmospheric and oceanic circulation, is associated with significant cooling of sea surface temperatures in the equatorial Pacific Ocean?
- A) Madden-Julian Oscillation (MJO)
 - B) Southern Annular Mode (SAM)
 - C) La Niña
 - D) Indian Ocean Dipole (IOD)
-

8. What is the term for the phenomenon where increased concentrations of greenhouse gases lead to a rise in global temperatures, which in turn affects the carbon cycle?

- A) Greenhouse Effect
 - B) Carbon Feedback Loop
 - C) Climate Resilience
 - D) Ocean Acidification
-

9. What is a major environmental risk associated with the thawing of permafrost?

- A) Decreased atmospheric water vapor
 - B) Release of greenhouse gases
 - C) Increased polar bear populations
 - D) Formation of new glaciers
-

10. Assertion (A): The increase in global temperatures is primarily driven by anthropogenic activities.

Reason (R): Natural climate variability, such as volcanic eruptions and solar radiation fluctuations, accounts for the majority of observed warming trends.

- A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
 - B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
 - C) (A) is true, but (R) is false.
 - D) (A) is false, but (R) is true.
-

11. Assertion (A): Climate change is the sole cause of increased frequency and intensity of hurricanes.

Reason (R): Other factors, such as natural climate cycles and local weather conditions, also play significant roles in hurricane formation and intensity.

- A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
 - B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
 - C) (A) is false, but (R) is true.
 - D) (A) is true, but (R) is false.
-

12. Assertion (A): Climate change mitigation strategies primarily focus on reducing fossil fuel consumption.

Reason (R): Effective climate action also requires adaptation strategies to cope with existing climate impacts that cannot be avoided through emissions reductions alone.

- A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

- C) (A) is true, but (R) is false.
 - D) (A) is false, but (R) is true.
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13. Which of the following particulate matter, also considered harmful to human health, remains suspended in air for the longest period?

- 1. PM10
 - 2. PM5
 - 3. PM2.5
 - 4. PM100
-

14. Short-term exposures to SO₂ can harm the human respiratory system and make breathing difficult. Which of the following industrial processes is the largest contributor to SO₂ emissions?

- A. Paper manufacturing
 - B. Rubber production
 - C. Textile dyeing
 - D. Coal-burning power plants
-

15. Consider the following statements and choose what happens to sunlight as it passes through Earth's atmosphere? Select the best answer from below.

- 1. Sunlight is absorbed.
- 2. Sunlight is reflected back into space.
- 3. Sunlight is scattered and some reaches the surface.
- 4. Sunlight is unaffected by the atmosphere.

Select the best answer from below.

- A. 1 and 2
 - B. 1 and 3
 - C. 1, 2 and 3
 - D. All the above
-

16. Which property allows gases like methane and water vapor to act as effective greenhouse gases?

- A) Their ability to form clouds in the atmosphere
 - B) Their ability to absorb and emit infrared radiation
 - C) Their high concentration in the atmosphere
 - D) Their interaction with ultraviolet radiation
-

17. Why are polar regions more affected by climate change than tropical regions?

- A) They are closer to the Sun during certain times of the year.
 - B) They have lower solar energy input and are sensitive to feedback loops like ice melting.
 - C) Their air pressure is higher, making heat retention easier.
 - D) They have more vegetation, which amplifies warming effects.
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18. What property of water helps regulate Earth's climate by storing and transporting heat?

- A) Its high albedo
 - B) Its low density when frozen
 - C) Its high specific heat capacity
 - D) Its ability to dissolve salts
-

19. What is the fundamental difference in approach to climate change between the Kyoto Protocol and the Paris Agreement? Choose the best option from the choices below.

- A) The Paris Agreement focuses exclusively on carbon pricing mechanisms, while the Kyoto Protocol only addresses carbon trading.
 - B) The Kyoto Protocol imposed legally binding emission reduction targets on developed countries, while the Paris Agreement introduced voluntary commitments for all nations, with a focus on flexible national plans.
 - C) The Kyoto Protocol includes explicit financial support for developing countries, while the Paris Agreement delegates this responsibility solely to private corporations.
 - D) The Paris Agreement mandates technology transfer from industrialized countries to developing countries, while the Kyoto Protocol does not address this issue.
-

20. Which of the following strategies most effectively integrates biodiversity conservation and climate change mitigation in the context of natural climate solutions?

- A) Large-scale industrial tree planting programs with minor consideration for biodiversity value or local ecosystems.
- B) Protecting and restoring tropical forests, wetlands, and peatlands to sequester carbon while preserving habitats for endangered species.
- C) Shifting to monoculture reforestation projects with high-value timber species for carbon offsetting.
- D) Expanding urban green spaces with the least biodiversity management practices or ecological restoration.

Quantitative Skills Questions (20 Questions)

1. In a class of 10 students, the average age is 16 years. If two new students join and the average age becomes 17 years, what is the average age of the two new students?
 - A) 18 years
 - B) 20 years
 - C) 22 years
 - D) 24 years
2. If a forest area of 1000 hectares is reduced by 10% annually, how much area will remain after 5 years?
 - A) 590.49 hectares
 - B) 656.1 hectares
 - C) 729 hectares
 - D) 810 hectares
3. A rectangular garden is twice as long as it is wide. If the perimeter of the garden is 48 meters, what is its area?
 - A) 144 m²
 - B) 192 m²
 - C) 128 m²
 - D) 72 m²
4. In a right triangle with legs measuring 6 cm and 8 cm, what is the length of the hypotenuse?
 - A) 10 cm
 - B) 12 cm
 - C) 14 cm
 - D) 16 cm
5. If a sum of money triples itself in five years at simple interest, what is the rate of interest per annum?

- A) 5%
- B) 10%
- C) 40%
- D) None of these

6. In a class of 30 students, 18 students play cricket, 12 play football, and 8 play both games. What is the probability that a student chosen at random plays either cricket or football?
- A) $\frac{2}{3}$
 - B) $\frac{3}{5}$
 - C) $\frac{11}{15}$
 - D) $\frac{7}{10}$
7. Why might you check for the spread (variance) of a dataset before making predictions?
- A) To identify how consistent the data points are.
 - B) To determine the average value in the dataset.
 - C) To remove outliers from the dataset.
 - D) To simplify the dataset for analysis.
8. When studying two variables, what does it mean if the trend line has a steep slope?
- A) Small changes in one variable lead to large changes in the other.
 - B) Both variables are constant over time.
 - C) One variable is unrelated to the other.
 - D) The trend line is not useful for analysis.
9. What does a loop do in programming?
- A) Defines a variable
 - B) Executes a block of code repeatedly
 - C) Stops the program
 - D) Calls an external function
10. If a dataset is normally distributed, approximately what percentage of data falls within 2 standard deviations of the mean?
- A) 68%
 - B) 95%
 - C) 99%
 - D) 50%
11. What does a probability value (p-value) of 0.03 indicate in a hypothesis test?
- A) There is a 3% chance the null hypothesis is incorrect.

- B) There is a 3% chance of observing the result if the null hypothesis is true.
- C) The test result is invalid.
- D) The sample size is too small.

12. In a regression analysis, which of the following indicates the strength of the linear relationship between the independent and dependent variables?

- A) The slope of the regression line
- B) The p-value of the regression model
- C) The correlation coefficient (r)
- D) The standard error of the estimate

13. What is the median of the following dataset: 7, 12, 9, 15, 10, 14, 8?

- A) 10
- B) 9
- C) 10
- D) 14

14. In hypothesis testing, if the p-value is less than the significance level (α), what is the correct action?

- A) Reject the null hypothesis
- B) Fail to reject the null hypothesis
- C) Accept the null hypothesis
- D) Increase the sample size

15. A community generates 500 kg of waste daily, of which 60% is biodegradable. How much biodegradable waste is generated in a week?

- A) 1,800 kg
- B) 2,100 kg
- C) 2,500 kg
- D) 3,000 kg

16. Given a dataset with an outlier, which measure of central tendency is the least affected by the outlier?

- A) Mean
- B) Median
- C) Mode

D) Range

17. A company wants to optimize its supply chain by reducing transportation costs. The current transportation cost follows a linear relationship:

$$\text{Cost} = 5x + 50,$$

where x is the distance in kilometers. If the company plans to reduce the cost by 30%, what should the new transportation cost formula be?

- A) $3.5x + 50$
- B) $4x + 35$
- C) $3.5x + 35$
- D) $4x + 40$

18. A farmer observes that the heights of 100 plants are normally distributed with a mean of 150 cm and a standard deviation of 10 cm. Approximately how many plants are expected to be between 140 cm and 160 cm?

- A) 34
- B) 68
- C) 95
- D) 84

19. A city records the following daily high temperatures over five days: 21°C, 25°C, 23°C, 27°C, and 24°C. The recorded temperatures are then adjusted based on a climate correction factor of +1.5 for each day. What is the average of the corrected temperatures?

- A) 24°C
- B) 25.3°C
- C) 25.5°C
- D) 26°C

20. A wind turbine generates 120 kWh of energy in 5 hours. If the generation rate remains constant, how much energy will it generate in 8 hours?

- A) 180 kWh
- B) 192 kWh
- C) 200 kWh
- D) 210 kWh

Data Literacy (10 Questions)

1. Which of the following best describes the purpose of data normalization?
 - A) To reduce the size of the dataset
 - B) To make data fit within a specific range or scale
 - C) To identify and remove outliers
 - D) To convert categorical data into numerical data

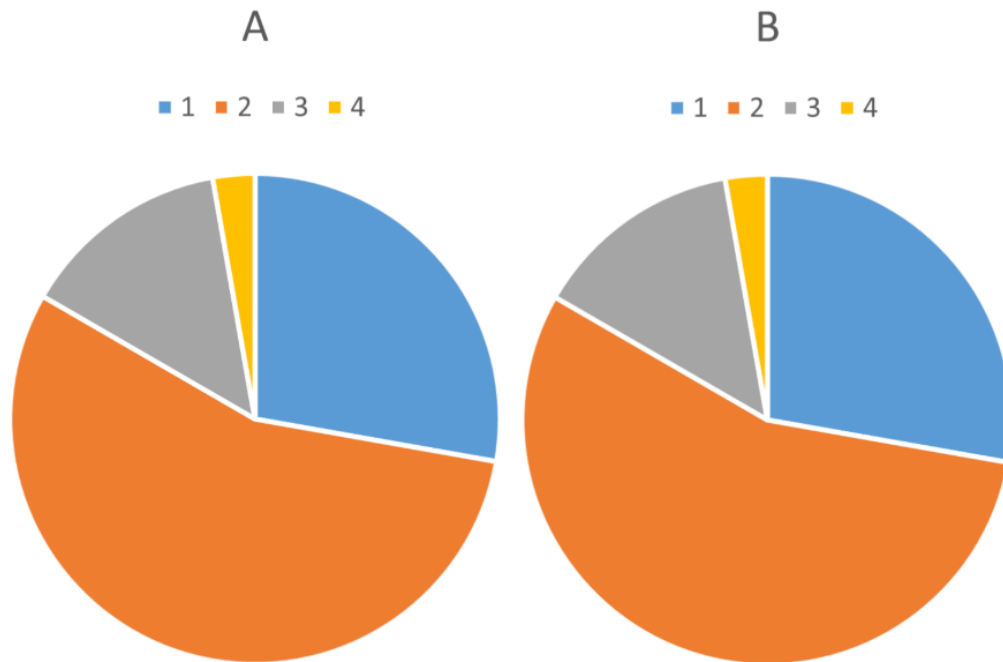
2. If the mean of a dataset is greater than the median, the distribution is likely to be:
 - A) Symmetrical
 - B) Uniform
 - C) Positively skewed
 - D) Negatively skewed

3. In a scatterplot showing the relationship between two variables, a point far from the rest of the data is called:
 - A) A correlation
 - B) A residual
 - C) A trendline
 - D) An outlier

4. Which of the following methods is most appropriate for handling missing data in a dataset where values are missing at random?
 - A) Deleting rows with missing values
 - B) Filling with random numbers
 - C) Imputing using the mean or median
 - D) Leaving them as they are

5. A histogram is most useful for:
 - A) Displaying the relationship between two variables
 - B) Showing the distribution of a single variable
 - C) Analyzing categorical data
 - D) Comparing percentages in different categories

6. Consider the following two graphs from two different datasets i.e. A and B containing variables 1, 2, 3 and 4. Read the observations a, b, c, and d.

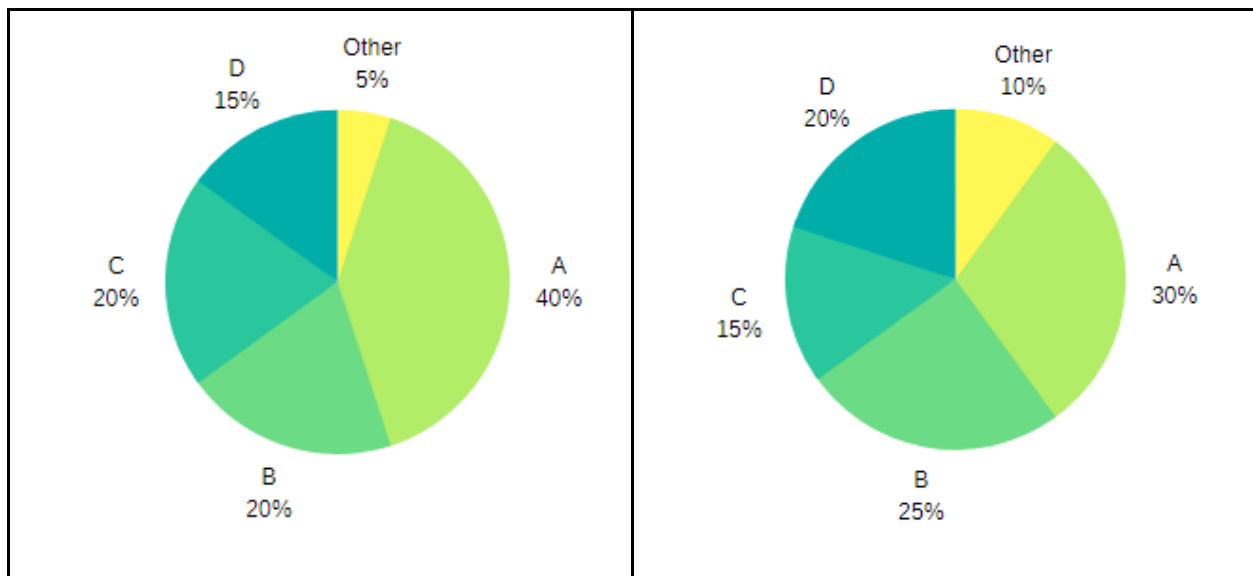


- a. The two datasets could have different absolute values
- b. The absolute value of variable 1 in both the datasets is same
- c. The relative proportions of the data in both the datasets is the same
- d. There is not enough information to arrive at any conclusions

Choose the option that is correct:

- A) Both a and b are correct
- B) Both b and c are correct
- C) Both a and d are incorrect
- D) Both b and d are incorrect

The two pie charts below show the percentage contribution of different energy sources (A, B, C, D and Others) to the total energy mix of a country in 2023 (left) and 2024 (right). Total energy output for 2023 = 150 TWh, Total energy output for 2024 = 375 TWh



7. Select the correct statement:

- A) Energy source D produced 22.5 TWh in 2023 and 80 TWh in 2024
- B) Energy source C produced 30 TWh in 2023 and 55.25 TWh in 2024
- C) Energy source B produced 30 TWh in 2023 and 89.75 TWh in 2024
- D) Energy source A produced 60 TWh in 2023 and 112.5 TWh in 2024

8. If each energy source increases its contribution to the total energy mix by 10%, what is the percentage growth of the total energy output of the country?

- A) 10%
- B) 20%
- C) 30%
- D) 8%

9. If the total energy output of the country is doubled for both 2023 and 2024, what would be the ratio of the contribution of Energy Source D in 2024 to its contribution in 2023?

- A) 2:1
- B) 4:3
- C) 15:8

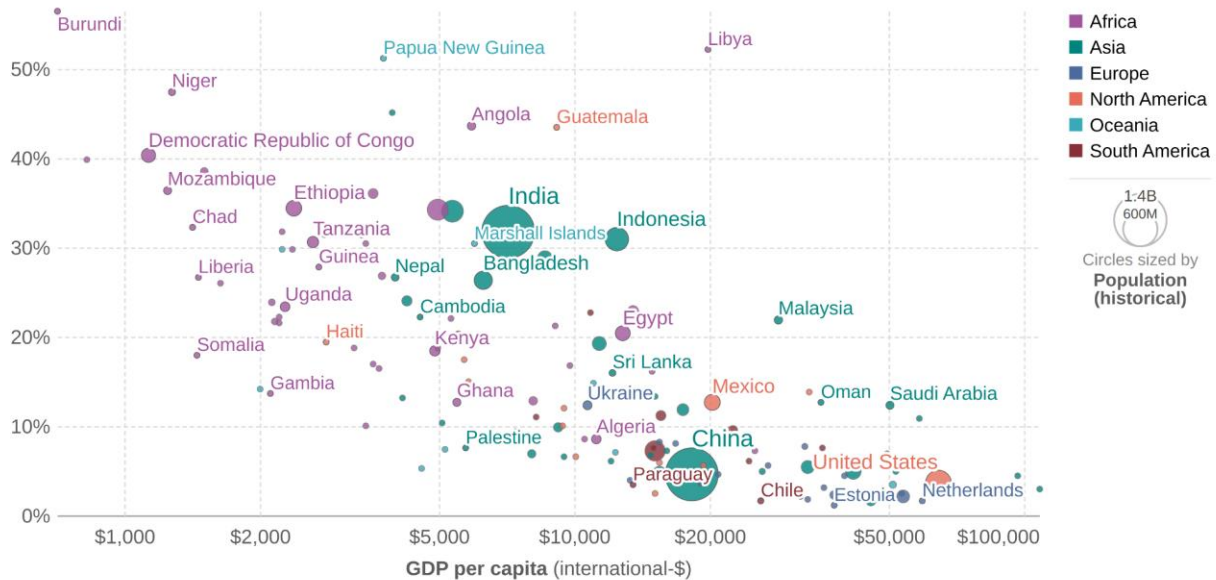
D) 10:3

10. Read the following graph and choose the correct answer from below:

Stunting vs. GDP per capita, 2022

Stunting¹ measures the share of children younger than 5 years that are too short for their age. GDP per capita data is adjusted for inflation and differences in the cost of living between countries.

Share of children who are stunted (% of children under 5)



Data source: UNICEF; World Health Organization; World Bank; World Bank (2023)

Note: This data is expressed in international-\$² at 2017 prices.

OurWorldinData.org/exemplars-in-global-health | CC BY

- A) Although Libya is economically poorer than India, it has managed to keep its child stunting rate much lower.
- B) Libya has experienced greater social and political turmoil compared to India over the last two decades.
- C) Libya has a higher per capita GDP than India and its rate of child stunting is also higher compared to India.
- D) Malaysia has a higher GDP per capita than Indonesia, it still couldn't manage to keep its child stunting rate much lower than Indonesia.

Climate and Sustainability (20 Questions)

1. **Assertion (A):** Aluminium can be infinitely recycled without losing its quality.

Reason (R): Aluminium recycling involves melting the metal, which does not degrade its physical properties.

- a) Both A and R are true, and R explains A
- b) Both A and R are true, but R does not explain A.
- c) A is true, but R is false.
- d) A is false, but R is true.

2. **Assertion (A):** The increase in atmospheric carbon dioxide results in ocean acidification, negatively impacting marine ecosystems.

Reason (R): When carbon dioxide dissolves in seawater, it reacts with water to form sulfuric acid, which lowers the ocean's pH and dissolves marine organisms' shells.

- a) Both A and R are true, and R explains A.
- b) Both A and R are true, but R does not explain A.
- c) A is true, but R is false.
- d) A is false, but R is true.

3. **Assertion (A):** Climate sensitivity is primarily influenced by cloud albedo feedback.

Reason (R): Cloud albedo feedback increases the absorption of infrared radiation, trapping more heat in the atmosphere and raising global temperatures.

- a) Both A and R are true, and R explains A.
- b) Both A and R are true, but R does not explain A.
- c) A is true, but R is false.
- d) A is false, but R is true.

4. What is the best definition of sustainability based on the given description?

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- b) Environmental conservation, economic growth, and social equity.
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- c) only 3
- d) Both 1 and 3

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- 2. Sustainability is a broader and less tangible concept compared to ESG.
- 3. ESG focuses only on environmental issues, while sustainability includes social and economic factors.
- 4. Companies use ESG criteria to make measurable decisions to become greener, more ethical, and better governed.

- a) 1 and 2
- b) 2 and 3
- c) 1, 3 and 4
- d) 1, 2 and 4

8. Which of the following correctly matches the climate agreements with their descriptions?

Name

Description

- | | |
|-------------------------|---|
| 1. Paris Agreement | A. Treaty to phase out substances depleting the ozone layer. |
| 2. Kyoto Protocol | B. Agreement from 2009 focusing on climate financing and emissions targets. |
| 3. Montreal Protocol | C. Agreement to limit global warming to below 2°C. |
| 4. Copenhagen Accord | D. First treaty with binding emissions reduction targets. |
| 5. Glasgow Climate Pact | E. Pact from COP26 focusing on climate action commitments. |

- a) 1-B, 2-A, 3-C, 4-D, 5-E
- b) 1-A, 2-C, 3-D, 4-E, 5-B
- c) 1-C, 2-D, 3-A, 4-B, 5-E
- d) 1-E, 2-B, 3-A, 4-C, 5-D

9. Which of the following correctly matches the sustainability-related terms with their descriptions?

- | | |
|---|--|
| 1. Natural Capital | A. Evaluation of environmental impacts before project approval. |
| 2. Social License to Operate (SLO) | B. Approval from communities for ethical practices. |
| 3. Just Transition | C. Capital comprising natural resources and ecosystems. |
| 4. Integrated Water Resources Management (IWRM) | D. Sustainable management of water resources. |
| 5. Sustainable Supply Chain Management | E. Fair transformation for workers during sustainability shifts. |
| 6. Carbon Sequestration | F. Agricultural practices that integrate ecological principles. |
| 7. Environmental Impact Assessment (EIA) | G. Capturing atmospheric carbon to combat climate change. |

8. Agroecology

H. Managing supply chains to enhance sustainability.

- a) 1-D, 2-B, 3-F, 4-C, 5-H, 6-G, 7-A, 8-E
- b) 1-C, 2-A, 3-B, 4-D, 5-F, 6-E, 7-G, 8-H
- c) 1-C, 2-B, 3-E, 4-D, 5-H, 6-G, 7-A, 8-F
- d) 1-F, 2-E, 3-C, 4-B, 5-D, 6-H, 7-G, 8-A

10. Which of the following correctly matches the Sustainable Development Goals (SDGs) with their corresponding goals?

SDG Name

Goal

- | | |
|-----------|---------------------------------------|
| 1. SDG 1 | A. Life Below Water |
| 2. SDG 6 | B. Affordable and Clean Energy |
| 3. SDG 7 | C. Clean Water and Sanitation |
| 4. SDG 11 | D. Climate Action |
| 5. SDG 13 | E. Sustainable Cities and Communities |
| 6. SDG 14 | F. No Poverty |
| 7. SDG 15 | G. Life on Land |
| 8. SDG 17 | H. Partnerships for the Goals |

- a) 1-A, 2-F, 3-C, 4-B, 5-D, 6-G, 7-H, 8-E
- b) 1-D, 2-E, 3-B, 4-F, 5-C, 6-G, 7-A, 8-H
- c) 1-F, 2-C, 3-B, 4-E, 5-D, 6-A, 7-G, 8-H
- d) 1-G, 2-A, 3-D, 4-E, 5-F, 6-H, 7-C, 8-B

11. Which of the following correctly matches the climate-related terms with their descriptions?

Terms	Descriptions
1. Radiative forcing	A. A system for trading carbon emission allowances to reduce industrial carbon footprints

Terms	Descriptions
2. Carbon sequestration	B. The change in energy balance in the Earth's atmosphere due to greenhouse gases
3. Cap-and-trade system	C. A scientific body that assesses climate change and provides global policymakers with regular reports.
4. IPCC (Intergovernmental Panel on Climate Change)	D. The process of capturing and storing atmospheric CO ₂ to mitigate climate change

- a) 1-B, 2-D, 3-A, 4-C
- b) 1-D, 2-B, 3-C, 4-A
- c) 1-A, 2-C, 3-B, 4-D
- d) 1-C, 2-A, 3-D, 4-B

12. India's Panchamrit strategy, announced at COP26, includes multiple commitments. Which of the following is NOT one of the five elements of this strategy?

- a) Installing 500 GW of non-fossil fuel energy capacity by 2030
- b) Reducing total greenhouse gas emissions by 30% by 2035
- c) Meeting 50% of electricity needs from renewable energy sources by 2030
- d) Reducing carbon emissions by 1 billion tonnes by 2030

13. Which of the following best explains why methane (CH₄) is a more potent greenhouse gas than carbon dioxide (CO₂) in the short term?

- a) Methane has a higher atmospheric concentration than CO₂.
- b) Methane has a higher global warming potential (GWP) over a 20-year timescale.
- c) Methane absorbs infrared radiation across a broader range of wavelengths than CO₂.
- d) Methane has a longer atmospheric lifetime than CO₂.

14. Which process contributes the most to anthropogenic nitrous oxide (N₂O) emissions globally?

- a) Fossil fuel combustion
- b) Industrial chemical production
- c) Agricultural soil management
- d) Biomass burning

15. The radiative forcing of a greenhouse gas is determined by several factors. Which of the following contributes the most to the radiative forcing of CO₂ in the modern era?

- a) The rate at which CO₂ is absorbed by the ocean
- b) The logarithmic relationship between CO₂ concentration and forcing
- c) The residence time of CO₂ in the atmosphere
- d) The ability of CO₂ to absorb shortwave solar radiation

16. The Earth's carbon-climate feedback mechanisms amplify global warming through several processes. Which of the following is an example of a positive carbon-climate feedback?

- a) Increased vegetation growth leading to higher carbon sequestration
- b) Permafrost thawing leading to methane release
- c) Higher CO₂ levels enhancing ocean alkalinity and increasing CO₂ uptake
- d) Increased oceanic CO₂ dissolution with rising temperatures

17. Which of the following statements about greenhouse gas emissions and their impact on ocean chemistry is correct?

- a) Increased CO₂ levels in the atmosphere cause ocean alkalinity to rise, reducing acidification.
- b) The absorption of CO₂ by oceans leads to a decrease in carbonate ion concentration, threatening marine calcifiers.
- c) Methane (CH₄) emissions contribute significantly to ocean acidification.
- d) The ocean has an unlimited capacity to absorb atmospheric CO₂ without altering its pH.

18. Which of the following statements best describes India's Net Zero target under its Long-Term Low Emissions Development Strategy (LT-LEDS) submitted to the UNFCCC?

- a) India aims to achieve Net Zero carbon emissions by 2047 to mark 100 years of independence.
- b) India has committed to achieving Net Zero by 2070 while ensuring energy security and equity.
- c) India has pledged to achieve Net Zero by 2060 in alignment with China's commitment.
- d) India's Net Zero target is conditional upon financial and technological support from developed nations, with no specific timeline.

19. According to India's updated Nationally Determined Contribution (NDC) submitted in 2022, what is the targeted reduction in emissions intensity of GDP by 2030 compared to 2005 levels?

- a) 33-35%
- b) 40-42%
- c) 45%
- d) 50%

20. Which of the following policies or initiatives is NOT directly aligned with India's Net Zero pathway?

- a) Green Hydrogen Mission
- b) Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME)
- c) Perform, Achieve, and Trade (PAT) Scheme
- d) National Adaptation Fund for Climate Change (NAFCC)

Quantitative Skills Questions (20 Questions)

1. A researcher conducts an experiment where the probability of event A occurring is 0.4 and the probability of event B occurring is 0.3. If A and B are independent, what is the probability that neither A nor B occurs?

- a) 0.12
- b) 0.42
- c) 0.52
- d) 0.58

2. If X is a random variable with $E(X)=5$ and $\text{Var}(X)=9$, what is $\text{Var}(3X+4)$?

- a) 9
- b) 27
- c) 81
- d) 36

3. Which of the following statements about the Central Limit Theorem (CLT) is **false**?

- a) The CLT states that the distribution of the sample mean approaches normality as the sample size increases.
- b) The CLT applies regardless of the distribution of the population.
- c) The CLT holds only when the population distribution is normal.
- d) The variance of the sample mean decreases as the sample size increases.

4. Which of the following is **not** a valid interpretation of a correlation coefficient $r = -0.9$ between two variables X and Y?

- a) X and Y have a strong inverse relationship.
- b) As X increases, Y tends to decrease.
- c) The relationship between X and Y is causal.
- d) A linear model would be a good fit for the data.

5. A hypothesis test is conducted at a significance level of 5% ($\alpha = 0.05$). If the p-value of the test is 0.03, what is the most appropriate conclusion?

- a) Fail to reject the null hypothesis.
- b) Reject the null hypothesis.
- c) Increase the sample size to confirm the result.
- d) The test is inconclusive.

6. A dataset consists of the values: 2, 3, 5, 5, 7, 10, 15. What is the median of the dataset?

- a) 5
- b) 6
- c) 7
- d) 5.5

7. Which of the following transformations does **not** change the standard deviation of a dataset?

- a) Multiplying each value by 2
- b) Adding 10 to each value
- c) Squaring each value
- d) Dividing each value by 2

8. A dataset has a first quartile (Q1) of 20, a third quartile (Q3) of 50, and an interquartile range (IQR) of 30. Which of the following values would be considered a mild outlier?

- a) 75
- b) 70

- c) 65
- d) 60

9. A distribution has a mean of 50, a median of 60, and a mode of 70. What can be inferred about the shape of the distribution?

- a) Symmetric
- b) Positively skewed
- c) Negatively skewed
- d) Uniform distribution

10. Two datasets have the following statistics:

- Dataset A: Mean = 100, Standard Deviation = 10
- Dataset B: Mean = 50, Standard Deviation = 8

Which dataset has a higher relative dispersion in terms of coefficient of variation (CV)?

- a) Dataset A
- b) Dataset B
- c) Both have the same CV
- d) Cannot be determined

11. A product originally priced at ₹5000 is first discounted by 20% and then the discounted price is further reduced by 10%. What is the final price?

- a) ₹3400
- b) ₹3600
- c) ₹3500
- d) ₹4000

12. If x satisfies the equation $x^2 - 6x + 8 = 0$, what is the sum of the reciprocals of its roots?

- a) $\frac{3}{4}$
- b) $\frac{2}{3}$
- c) $\frac{4}{5}$
- d) $\frac{1}{2}$

13. A fair die is rolled twice. What is the probability that the sum of the numbers rolled is at least 10?

- a) $1/6$
- b) $1/21$
- c) $1/4$
- d) $1/9$

14. Find the next number in the sequence: **3, 7, 15, 31, 63, ?**

- a) 127
- b) 126
- c) 130
- d) 124

15. If $\log_2 X=5$, what is the value of x?

- a) 25
- b) 32
- c) 64
- d) 10

16. A train 200 m long crosses a bridge of length 400 m in 30 seconds. What is the speed of the train in m/s?

- a) 15 m/s
- b) 20 m/s
- c) 25 m/s
- d) 10 m/s

17. The average of 5 numbers is **20**. If one number is removed and the new average becomes **18**, what is the number that was removed?

- a) 25
- b) 28
- c) 30
- d) 32

18. A rectangle has a length 3 times its width. If its perimeter is 48 cm, what is its area?

- a) 108 cm²
- b) 96 cm²
- c) 120 cm²
- d) 144 cm²

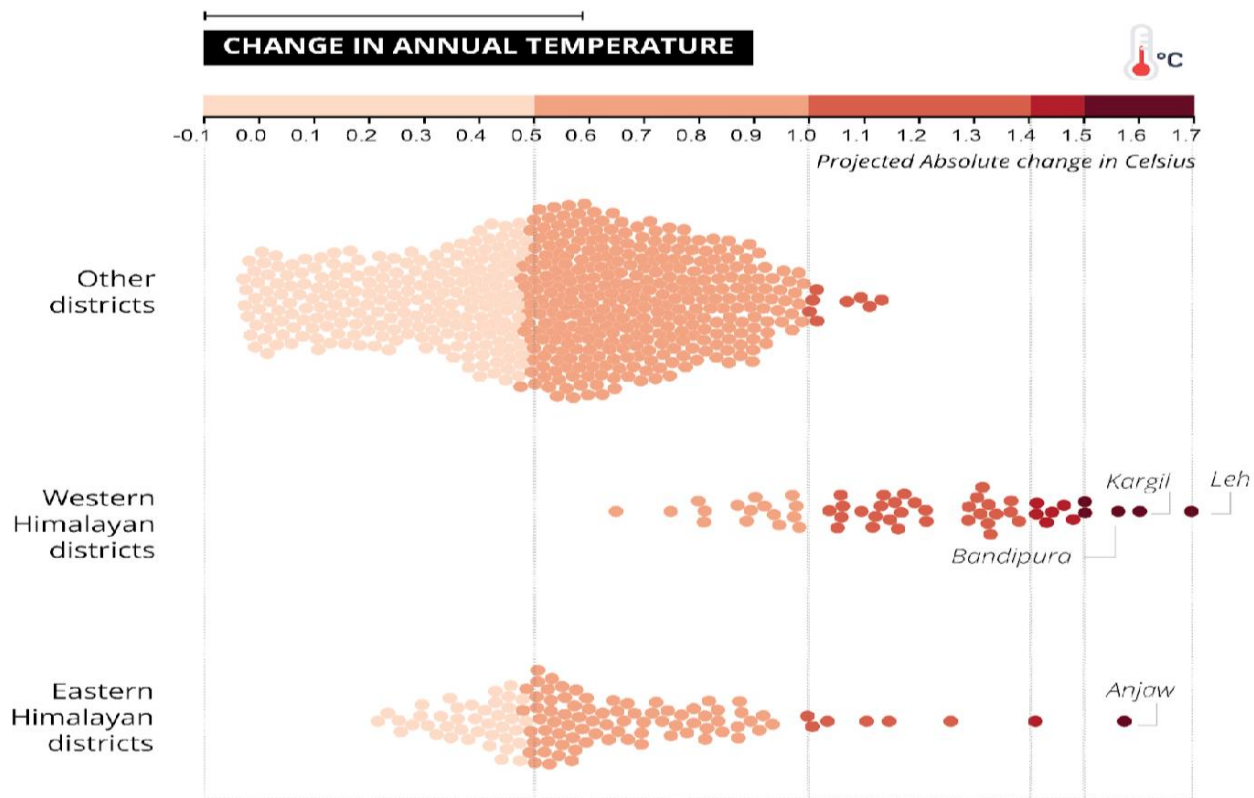
19. Which number does **not** belong in the series? **1, 4, 9, 16, 25, 37, 49**

- a) 9
- b) 25
- c) 37
- d) 49

20. A mixture contains milk and water in the ratio 5:2. If 14 liters of water are added, the new ratio becomes 5:4. What was the original quantity of milk?

- a) 30 litres
- b) 28 litres
- c) 35 litres
- d) 25 litres

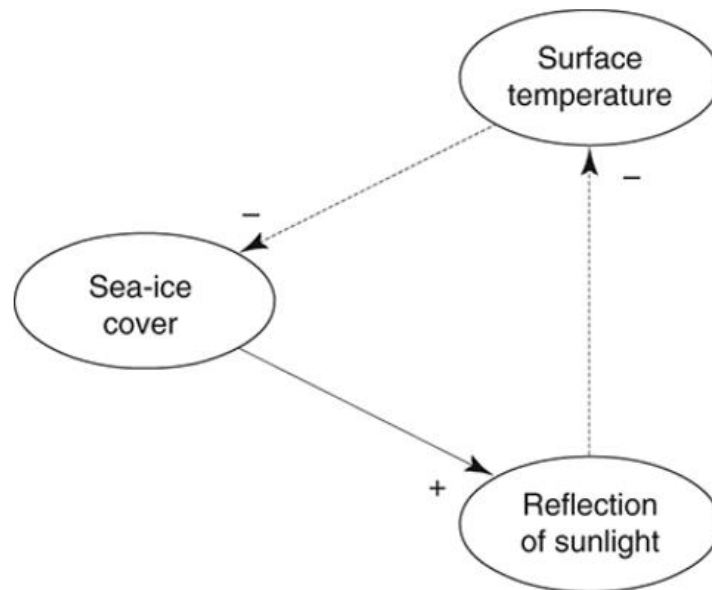
Data Literacy Questions (10 Questions)



The following chart shows the projected changes in Annual Temperature for all the Indian districts under a certain IPCC scenario (SSP245). Read the chart and answer the following question:

1. Which of the following statements is NOT correct
 - a) The number of districts in the Western Himalayas expected to experience an annual temperature rise of 1.4°C or more is higher than in the rest of India.
 - b) Himalayan districts are projected to witness the most significant increases in annual temperature compared to other regions of the country.
 - c) The number of districts in the Eastern Himalayas projected to experience an annual temperature increase of 1°C or more is approximately half that of the Western Himalayan districts.
 - d) All districts in the Western Himalayas will experience at least a 0.5°C rise in annual temperature.

2. The following chart shows a causal-loop diagram of surface temperature, sea-ice cover and reflection of sunlight. Choose the correct statement from below.



- a) Increasing surface temperature will increase the sea-ice cover and hence increase the reflection of sunlight.
- b) Increasing reflection of sunlight will increase the temperature and hence decrease the sea-ice cover.
- c) Increasing surface temperature will decrease the sea-ice cover and hence decrease the reflection of sunlight.
- d) Decreasing surface temperature will decrease the sea-ice cover and hence decrease the reflection of sunlight.

3. Which of the following best describes the purpose of data normalization?

- a) To reduce the size of the dataset
- b) To make data fit within a specific range or scale
- c) To identify and remove outliers
- d) To convert categorical data into numerical data

4. In a scatterplot showing the relationship between two variables, a point far from the rest of the data is called:

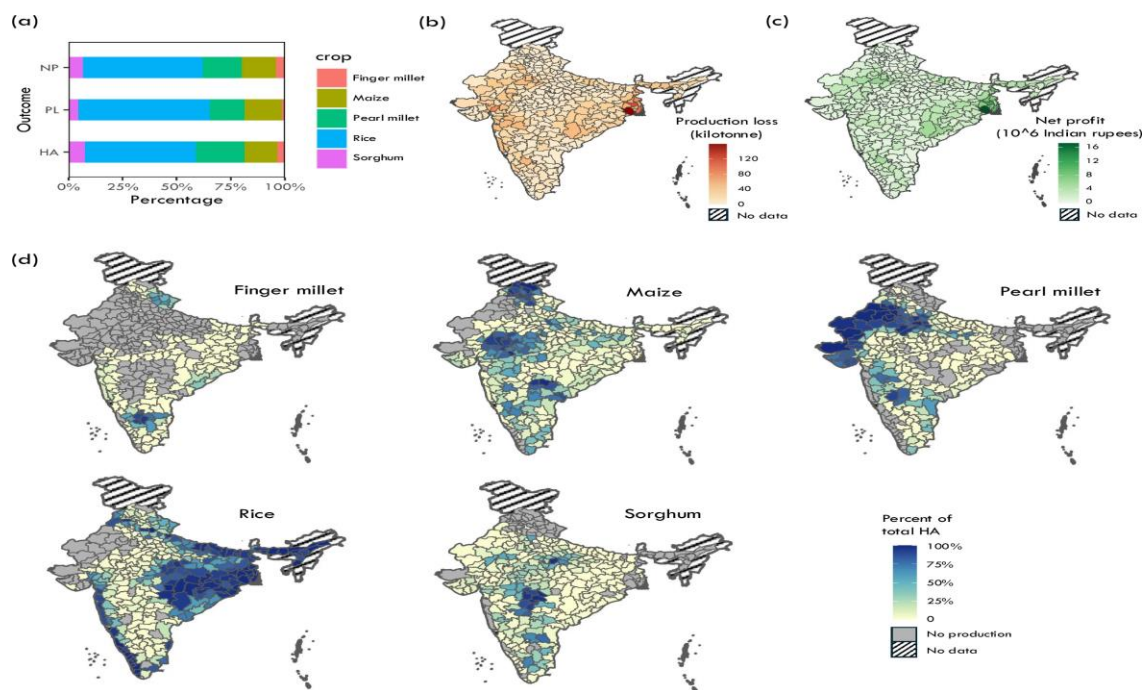
- a) A correlation
- b) A residual
- c) A trendline

d) An outlier

5. Which of the following methods is most appropriate for handling missing data in a dataset where values are missing at random?

- a) Deleting rows with missing values
- b) Filling with random numbers
- c) Imputing using the mean or median
- d) Leaving them as they are

6. The image presents data related to crop production and losses in India, focusing on five specific crops: finger millet, maize, pearl millet, rice, and sorghum. It includes the following figures:



- a) **Stacked Bar Chart:** Shows the percentage of different crops in three categories: NP (likely "Not Planted" or "Negative Production"), PL (likely "Production Loss"), and HA (likely "Harvested Area").
 - b) **Map of India (Production Loss):** Displays production loss in kilotonnes across different regions of India using a color gradient.
 - c) **Map of India (Net Profit):** Shows net profit in 10^6 Indian rupees across different regions of India using a color gradient.
 - d) **Maps of India (Harvested Area Percentage):** Shows the percentage of total harvested area for each of the five crops across different regions of India using a color gradient.
7. Based on the stacked bar chart (a), which crop shows the highest percentage in the 'Harvested

Area' (HA) category?

- a) Finger millet
- b) Maize
- c) Rice
- d) Sorghum

8. According to the production loss map (b), which region of India appears to have experienced the highest production loss in kilotonnes?

- a) Northern India
- b) Southern India
- c) Eastern India
- d) Central India

9. In the net profit map (c), which color gradient indicates the highest net profit in 10^6 Indian rupees?

- a) Dark green
- b) Light green
- c) Orange
- d) Red

10. Considering the harvested area percentage maps (d), which crop appears to have the most widespread cultivation (highest percentage of total HA) across India?

- a) Finger millet
- b) Maize
- c) Pearl millet
- d) Rice

11. Which of the following statements is NOT supported by the information presented in the maps?

- a) Regions with high production loss generally show lower net profit.
- b) Rice cultivation is concentrated in specific areas of India.
- c) Finger millet has the highest net profit among all crops.
- d) Some regions in India have no data for both production loss and net profit.