

Test Booklet Series



**Test Booklet**  
**(Environment Science)**

Test Booklet No.

Name of Applicant .....

Answer Sheet No. ....

Applicant ID/Roll No. : .....

Signature of Applicant : .....

Date of Examination : .....

Signature of the Invigilator(s)

Time of Examination : .....

1. ....

2. ....

**Duration : 2 Hour]**

**[Maximum Marks : 100**

**IMPORTANT INSTRUCTIONS**

- (i) The question paper is in the form of Test-Booklet containing **100 (Hundred)** questions. All questions are compulsory. Each question carries four answers marked (A), (B), (C) and (D), out of which only one is correct. Choose the correct option or the most appropriate option.
- (ii) On receipt of the Test-Booklet (Question Paper), the candidate should immediately check it and ensure that it contains all the pages, i.e., **100** questions. Discrepancy, if any, should be reported by the candidate to the invigilator immediately after receiving the Test-Booklet.
- (iii) A separate Answer-Sheet is provided with the Test-Booklet/Question Paper. On this sheet there are **100** rows containing four circles each. One row pertains to one question.
- (iv) The candidate should write his/her Application ID/Roll number at the places provided on the cover page of the Test-Booklet/Question Paper and on the Answer-Sheet and NOWHERE ELSE.
- (v) No second Test-Booklet/Question Paper and Answer-Sheet will be given to a candidate. The candidates are advised to be careful in handling it and writing the answer on the Answer-Sheet.
- (vi) For every correct answer of the question **One (1) mark will be awarded.**
- (vii) Marking shall be done only on the basis of answers responded on the Answer-Sheet.
- (viii) To mark the answer on the Answer-Sheet, candidate should darken the appropriate circle in the row of each question with Blue or Black pen.
- (ix) For each question only **one** circle should be **darkened** as a mark of the answer adopted by the candidate. If more than one circle for the question are found darkened or with one black circle any other circle carries any mark, the answer will be treated as incorrect.
- (x) The candidates should not remove any paper from the Test-Booklet/Question Paper. Attempting to remove any paper shall be liable to be punished for use of unfair means.
- (xi) Rough work may be done on the blank space provided in the Test-Booklet/Question Paper only.
- (xii) *Mobile phones (even in Switch-off mode) and such other communication/programmable devices are not allowed inside the examination hall.*
- (xiii) No candidate shall be permitted to leave the examination hall before the expiry of the time.

**DO NOT OPEN THIS QUESTION BOOKLET UNTIL ASKED TO DO SO.**



**PART-A**  
**(Research Methodology)**

1. The main objective of fundamental/basic research is:  
(A) To solve an immediate practical problem  
(B) To discover new facts and develop theories  
(C) To evaluate existing social programs  
(D) To study historical events
  
2. The scientific method of research is characterized by:  
(A) Subjectivity and intuition  
(B) Empiricism, objectivity, and replicability  
(C) Relying solely on authority  
(D) Lack of logical reasoning
  
3. While selecting a research topic, which of the following is the LEAST important consideration?  
(A) Feasibility of the study  
(B) Researcher's interest  
(C) Availability of funds and time  
(D) Personal biases of the researcher
  
4. The ethical principle of "Informed Consent" implies that:  
(A) Participants must be forced to participate for the greater good  
(B) Participants must be fully aware of the research procedures and agree voluntarily  
(C) Researchers can hide the true purpose of the study to avoid bias  
(D) Data can be shared publicly without participant knowledge
  
5. Fabrication, falsification, and plagiarism in research are collectively known as:  
(A) Research misconduct  
(B) Sampling error  
(C) Ethical compliance  
(D) Research methodology
  
6. Which research design is primarily concerned with describing the characteristics of a population or phenomenon?  
(A) Exploratory research design  
(B) Descriptive research design  
(C) Experimental research design  
(D) Diagnostic research design
  
7. In an experimental research design, the variable that is intentionally manipulated by the researcher is the:  
(A) Dependent variable  
(B) Extraneous variable  
(C) Independent variable  
(D) Control variable

8. Research conducted to find out the causes of an event that has already happened, without manipulating variables, is known as:
- (A) Action research (B) Ex-post facto research  
(C) Applied research (D) Pure research
9. The "Control Group" in an experimental design is used to:
- (A) Introduce the experimental treatment  
(B) Serve as a baseline for comparison with the experimental group  
(C) Eliminate the dependent variable  
(D) Increase the sample size
10. Deductive reasoning in the scientific method moves from:
- (A) Specific observations to general theories  
(B) General theories to specific hypotheses  
(C) Empirical data to conceptualization  
(D) Null hypothesis to alternative hypothesis
11. Internal validity in an experimental design refers to:
- (A) The generalizability of the findings to the real world  
(B) The certainty that the independent variable caused the changes in the dependent variable  
(C) The consistency of the measuring instrument  
(D) The representativeness of the sample
12. If every member of the population has an equal and independent chance of being selected, the sampling technique is called:
- (A) Purposive sampling (B) Convenience sampling  
(C) Simple random sampling (D) Quota sampling
13. When the population is heterogeneous with distinct subgroups (strata), the most appropriate probability sampling technique is:
- (A) Simple random sampling (B) Stratified random sampling  
(C) Cluster sampling (D) Snowball sampling

14. In cluster sampling, the sampling units selected are:
- (A) Individual elements
  - (B) Natural groupings or categories (e.g., districts, schools)
  - (C) Homogeneous subgroups
  - (D) Volunteers
15. Snowball sampling is specifically used when:
- (A) The population size is very large
  - (B) The sampling frame is readily available
  - (C) The population is hidden, rare, or difficult to access
  - (D) The researcher needs a perfectly representative sample
16. The difference between a sample statistic and the true population parameter is termed as:
- (A) Systematic error
  - (B) Sampling error
  - (C) Measurement error
  - (D) Non-sampling error
17. Which measurement scale classifies data into mutually exclusive categories without any order or ranking?
- (A) Ordinal scale
  - (B) Interval scale
  - (C) Nominal scale
  - (D) Ratio scale
18. A Likert scale (Strongly Disagree to Strongly Agree) is technically an example of:
- (A) Nominal scale
  - (B) Ordinal scale
  - (C) Interval scale
  - (D) Ratio scale
19. Which scaling technique asks respondents to rate an object on a series of bipolar adjectives (e.g., Good-Bad, Fast-Slow)?
- (A) Likert scale
  - (B) Guttman scale
  - (C) Semantic Differential scale
  - (D) Thurstone scale

- 20.** The key difference between a questionnaire and a schedule is:
- (A) A questionnaire is filled by the enumerator, a schedule is filled by the respondent
  - (B) A questionnaire is filled by the respondent, a schedule is filled by the enumerator/ interviewer
  - (C) A schedule is mailed, a questionnaire is given face-to-face
  - (D) There is no difference between them
- 21.** Data collected by the researcher themselves for the specific purpose of the current study is called:
- (A) Secondary data
  - (B) Primary data
  - (C) Official data
  - (D) Documentary data
- 22.** The process of checking the raw data to ensure completeness, accuracy, and consistency before analysis is called:
- (A) Coding
  - (B) Editing
  - (C) Tabulation
  - (D) Classification
- 23.** Assigning numerical values or symbols to the responses for computational purposes is known as:
- (A) Editing
  - (B) Coding
  - (C) Transcription
  - (D) Tabulation
- 24.** A histogram is used to graphically represent the distribution of:
- (A) Discrete/categorical data
  - (B) Continuous data grouped into class intervals
  - (C) Qualitative characteristics
  - (D) Proportions of a whole
- 25.** A pie chart is most effective for representing:
- (A) Trends over time
  - (B) The relationship between two continuous variables
  - (C) The percentage breakdown of a whole
  - (D) Frequency distribution of continuous data

26. A hypothesis that states there is no significant difference or relationship is called:
- (A) Directional hypothesis
  - (B) Non-directional hypothesis
  - (C) Null hypothesis
  - (D) Alternative hypothesis
27. "Students who study using method A will score significantly higher than those who study using method B." This is an example of:
- (A) Null hypothesis
  - (B) Directional alternative hypothesis
  - (C) Non-directional alternative hypothesis
  - (D) Ex-post facto hypothesis
28. A Type I error in hypothesis testing occurs when:
- (A) We fail to reject a true null hypothesis
  - (B) We reject a true null hypothesis
  - (C) We fail to reject a false null hypothesis
  - (D) We reject a false null hypothesis
29. The probability of committing a Type I error is denoted by:
- (A) Beta ( $\beta$ )
  - (B) Alpha ( $\alpha$ )
  - (C) P-value
  - (D) Standard error
30. A statistical test that makes assumptions about the population parameters (like normal distribution, homogeneity of variance) is called:
- (A) Non-parametric test
  - (B) Parametric test
  - (C) Chi-square test
  - (D) Distribution-free test
31. The Chi-square ( $\chi^2$ ) test is primarily used to test:
- (A) The difference between means of two groups
  - (B) The association between two categorical variables
  - (C) The significance of regression coefficients
  - (D) The variance within a single group

32. In a Chi-square test of independence, if the calculated value of  $\chi^2$  is greater than the critical/ table value at the 0.05 level, we:
- (A) Accept the null hypothesis
  - (B) Reject the null hypothesis
  - (C) Conclude the variables are independent
  - (D) Conclude the sample is biased
33. The formula for calculating expected frequency (E) in a Chi-square contingency table cell is:
- (A) (Row Total  $\times$  Column Total) / Grand Total
  - (B) (Row Total + Column Total) / Grand Total
  - (C) Grand Total / (Row Total  $\times$  Column Total)
  - (D) Row Total / Column Total
34. Analysis of Variance (ANOVA) is used instead of multiple t-tests to compare the means of three or more groups because:
- (A) ANOVA is easier to calculate
  - (B) Multiple t-tests increase the risk of Type I error
  - (C) ANOVA does not require normal distribution
  - (D) ANOVA uses nominal data
35. In a one-way ANOVA, the "one way" refers to:
- (A) One dependent variable and one independent variable with multiple levels
  - (B) One independent variable and multiple dependent variables
  - (C) Only one sample being tested
  - (D) One-tailed test of significance
36. The F-ratio in One-way ANOVA is calculated as:
- (A) Within-group variance / Between-group variance
  - (B) Between-group variance / Within-group variance
  - (C) Total variance / Residual variance
  - (D) Mean square error / Mean square total
37. The degrees of freedom for "Between Groups" in a One-Way ANOVA with 'k' groups is:
- (A)  $N - 1$
  - (B)  $N - k$
  - (C)  $k - 1$
  - (D)  $(N - 1) - (k - 1)$

38. Which of the following is a non-parametric alternative to One-way ANOVA?  
(A) Kruskal-Wallis test (B) Mann-Whitney U test  
(C) Wilcoxon signed-rank test (D) Chi-square goodness of fit
39. A multivariate statistical technique used to reduce a large number of interrelated variables to a smaller set of unobservable factors is:  
(A) Cluster Analysis (B) Factor Analysis  
(C) Discriminant Analysis (D) Conjoint Analysis
40. In Factor Analysis, the proportion of variance in a specific variable explained by the common factors is called:  
(A) Communality (B) Eigenvalue  
(C) Factor loading (D) Uniqueness
41. Which concept in Factor Analysis represents the total variance explained by a specific factor across all variables?  
(A) Communality (B) Eigenvalue  
(C) Factor score (D) Rotation
42. Multiple Regression is used to:  
(A) Classify objects into groups  
(B) Predict the value of a dependent variable based on two or more independent variables  
(C) Reduce the number of variables  
(D) Determine the association between two categorical variables
43. In Multiple Regression, the coefficient of multiple determination ( $R^2$ ) represents:  
(A) The correlation between two independent variables  
(B) The proportion of variance in the dependent variable explained by all independent variables  
(C) The regression coefficient of the strongest predictor  
(D) The standard error of the estimate
44. Pearson's correlation coefficient ( $r$ ) measures:  
(A) The causal relationship between two variables  
(B) The linear association between two continuous variables  
(C) The association between two categorical variables  
(D) The variance of a single variable

45. If the Pearson correlation coefficient between X and Y is  $-0.85$ , it indicates:
- (A) A weak positive relationship                      (B) A strong positive relationship  
(C) A strong negative relationship                      (D) No relationship
46. Which multivariate technique is used to group objects or individuals so that objects in the same group are highly similar to each other but different from objects in other groups?
- (A) Discriminant Analysis                      (B) Factor Analysis  
(C) Cluster Analysis                      (D) Conjoint Analysis
47. The main difference between Cluster Analysis and Discriminant Analysis is that:
- (A) Cluster analysis requires predefined groups, discriminant analysis does not  
(B) Discriminant analysis requires predefined groups, cluster analysis does not  
(C) Cluster analysis uses metric data, discriminant analysis uses non-metric  
(D) Discriminant analysis is for data reduction, cluster analysis is for prediction
48. Conjoint Analysis is primarily used in marketing research to:
- (A) Determine the optimal number of clusters  
(B) Measure how consumers value different features of a product by analyzing trade-offs  
(C) Reduce the dimensions of product features  
(D) Classify customers into predefined demographic groups
49. The standard format for writing a quantitative research report is generally known by the acronym:
- (A) IMRAD (Introduction, Method, Results, And Discussion)  
(B) PEST (Political, Economic, Social, Technological)  
(C) SWOT (Strengths, Weaknesses, Opportunities, Threats)  
(D) APA (American Psychological Association)
50. Which section of the research report contains a brief summary of the entire study, including the problem, methodology, major findings, and conclusions?
- (A) Introduction                      (B) Abstract/Executive Summary  
(C) Literature Review                      (D) Discussion

**PART-B**  
**(Environment Science)**

- 51.** Which gas constitutes the largest proportion of Earth's atmosphere by volume?  
(A) Oxygen (B) Nitrogen  
(C) Carbon dioxide (D) Argon
- 52.** According to the Hardy–Weinberg principle, allele frequencies remain constant only when:  
(A) Mutation and natural selection are absent  
(B) Population size is small  
(C) Migration occurs continuously  
(D) Natural selection favours heterozygotes
- 53.** Which of the following pollutants is considered a secondary air pollutant?  
(A) Carbon monoxide (B) Sulfur dioxide  
(C) Ozone (D) Lead
- 54.** In an aquatic ecosystem, the major source of dissolved oxygen is:  
(A) Respiration by aquatic organisms  
(B) Photosynthesis by phytoplankton and diffusion from the atmosphere  
(C) Groundwater discharge only  
(D) Decomposition of organic matter
- 55.** Which analytical instrument is most suitable for determining trace concentrations of heavy metals such as cadmium and lead in drinking water?  
(A) UV-Visible Spectrophotometer  
(B) Flame Photometer  
(C) Atomic Absorption Spectrophotometer (AAS)  
(D) Nephelometer
- 56.** A river contains  $6 \text{ mg L}^{-1}$  dissolved oxygen. The saturation DO at that temperature is  $9 \text{ mg L}^{-1}$ .  
The percentage oxygen saturation is:  
(A) 50% (B) 60%  
(C) 66.7% (D) 75%

57. Which one of the following microorganisms plays a major role in biological nitrogen fixation?  
 (A) *Nitrosomonas* (B) *Nitrobacter*  
 (C) *Rhizobium* (D) *Pseudomonas*
58. According to the Intermediate Disturbance Hypothesis, maximum species diversity occurs under:  
 (A) No disturbance (B) Very high disturbance  
 (C) Intermediate levels of disturbance (D) Seasonal disturbance only
59. **Assertion (A):** Thermal inversion can significantly increase urban air pollution.  
**Reason (R):** During temperature inversion, vertical mixing of air is suppressed.  
 (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.  
 (C) A is true, but R is false.  
 (D) A is false, but R is true.
60. Consider the following statements regarding ozone depletion:  
 1. Chlorine radicals catalytically destroy ozone.  
 2. Polar Stratospheric Clouds accelerate ozone depletion.  
 3. CFCs are chemically stable in the troposphere.  
 4. Ozone depletion directly increases ultraviolet-B radiation reaching Earth's surface.  
 Which of the following is correct?  
 (A) 1 and 2 only (B) 2, 3 and 4 only  
 (C) 1, 2 and 4 only (D) 1, 2, 3 and 4
61. The process by which pesticides become increasingly concentrated at successive trophic levels is known as:  
 (A) Bioaccumulation (B) Bioconcentration  
 (C) Biomagnification (D) Biodegradation
62. Which one of the following indices is most widely used to measure species diversity by incorporating both richness and evenness?  
 (A) Simpson's Diversity Index (B) Shannon–Wiener Index  
 (C) Sorensen Similarity Index (D) Margalef Index

63. Consider the following statements regarding Geographic Information Systems (GIS):
1. GIS integrates spatial and attribute data.
  2. Raster data are best suited for representing continuous variables.
  3. Vector data represent points, lines and polygons.
  4. GIS cannot perform overlay analysis.
- Which of the following is correct?
- (A) 1 and 2 only (B) 2 and 4 only  
(C) 1, 2 and 3 only (D) 1, 2, 3 and 4
64. The major environmental concern associated with excessive nitrate contamination in groundwater is:
- (A) Fluorosis (B) Minamata disease  
(C) Methemoglobinemia (D) Itai-itai disease
65. Which of the following soil properties generally exhibits the highest cation exchange capacity (CEC)?
- (A) Sandy soil  
(B) Silty soil  
(C) Clay-rich soil containing montmorillonite  
(D) Gravelly soil
66. Which of the following international agreements aims primarily at protecting the ozone layer?
- (A) Kyoto Protocol (B) Paris Agreement  
(C) Montreal Protocol (D) Ramsar Convention
67. The major function of a cyclone separator in air pollution control is to remove:
- (A) Gaseous pollutants (B) Fine aerosols below 0.1  $\mu\text{m}$   
(C) Coarse particulate matter (D) Volatile organic compounds
68. Which one of the following microorganisms is widely used as a biofertilizer in paddy cultivation due to its nitrogen-fixing ability?
- (A) *Escherichia coli* (B) *Azolla–Anabaena* association  
(C) *Saccharomyces cerevisiae* (D) *Lactobacillus* spp.

69. Which of the following satellite missions is widely used for medium-resolution Earth observation and natural resource monitoring?
- (A) INSAT-3D (B) IRS Resourcesat  
(C) Chandrayaan-3 (D) GSAT-30
70. **Assertion (A):** Constructed wetlands are increasingly used for wastewater treatment.  
**Reason (R):** Wetland vegetation, microbial communities, and sediments together facilitate pollutant removal through physical, chemical, and biological processes.
- (A) Both A and R are true, and R is the correct explanation.  
(B) Both A and R are true, but R is not the correct explanation.  
(C) A is true, but R is false.  
(D) A is false, but R is true.
71. Which one of the following pollutants is responsible for Minamata disease?
- (A) Cadmium (B) Mercury  
(C) Lead (D) Arsenic
72. Which microorganism is most commonly employed in the activated sludge process for wastewater treatment?
- (A) Methanogenic archaea only (B) Mixed aerobic bacterial consortium  
(C) Cyanobacteria (D) Yeasts only
73. Which environmental parameter is measured using a **Secchi disk**?
- (A) Salinity (B) Turbidity/Water transparency  
(C) Water hardness (D) Chlorophyll concentration
74. Consider the following statements regarding Atomic Absorption Spectroscopy (AAS):
1. AAS measures absorption of element-specific radiation by free atoms.
  2. Hollow cathode lamps are commonly used as radiation sources.
  3. AAS is widely used for heavy metal analysis.
  4. AAS simultaneously determines all elements in a sample with equal sensitivity.
- Which of the following is correct?
- (A) 1 and 2 only (B) 1, 2 and 3 only  
(C) 2, 3 and 4 only (D) 1, 2, 3 and 4

75. A water sample contains:
- Calcium hardness =  $160 \text{ mg L}^{-1}$  as  $\text{CaCO}_3$
  - Magnesium hardness =  $80 \text{ mg L}^{-1}$  as  $\text{CaCO}_3$
- The total hardness of the sample is:
- (A)  $160 \text{ mg L}^{-1}$  (B)  $200 \text{ mg L}^{-1}$   
(C)  $240 \text{ mg L}^{-1}$  (D)  $320 \text{ mg L}^{-1}$
76. Which microorganism is primarily responsible for the oxidation of ammonia into nitrite during nitrification?
- (A) *Nitrobacter* (B) *Nitrosomonas*  
(C) *Azotobacter* (D) *Rhizobium*
77. The Bray-Curtis Index is commonly used to measure:
- (A) Soil fertility  
(B) Community similarity based on species abundance  
(C) Atmospheric stability  
(D) River discharge
78. Which remote sensing index is most widely used for monitoring vegetation health?
- (A) NDVI (B) NDBI  
(C) NDWI (D) SAVI
79. Which of the following analytical instruments is most suitable for simultaneous multi-element analysis at trace concentrations?
- (A) UV-Visible Spectrophotometer (B) Flame Photometer  
(C) ICP-OES (D) Colorimeter
80. Consider the following statements regarding bioleaching:
1. *Acidithiobacillus ferrooxidans* is widely used in bioleaching.
  2. Bioleaching is generally more environmentally friendly than pyrometallurgical extraction.
  3. Bioleaching is applicable only to precious metals.
  4. Ferric iron acts as an oxidizing agent during sulfide mineral dissolution.
- Which of the following is correct?
- (A) 1 and 2 only (B) 1, 2 and 4 only  
(C) 2, 3 and 4 only (D) 1, 2, 3 and 4

- 81.** The major purpose of adding alum  $[\text{Al}_2(\text{SO}_4)_3]$  during drinking water treatment is to:
- (A) Increase alkalinity
  - (B) Remove dissolved oxygen
  - (C) Promote coagulation and flocculation of suspended particles
  - (D) Disinfect pathogenic microorganisms
- 82.** An industry discharges  $450 \text{ m}^3 \text{ day}^{-1}$  of wastewater containing  $80 \text{ mg L}^{-1}$  of total phosphorus. The daily phosphorus load discharged is:
- (A)  $18 \text{ kg day}^{-1}$
  - (B)  $24 \text{ kg day}^{-1}$
  - (C)  $36 \text{ kg day}^{-1}$
  - (D)  $45 \text{ kg day}^{-1}$
- 83.** In microbial growth kinetics, the exponential (log) phase is characterized by:
- (A) Zero cell division
  - (B) Maximum and constant specific growth rate
  - (C) Declining population due to nutrient depletion
  - (D) Complete cessation of metabolism
- 84.** Which one of the following environmental laws regulates the transboundary movement of hazardous wastes?
- (A) Ramsar Convention
  - (B) Vienna Convention
  - (C) Basel Convention
  - (D) Convention on Migratory Species
- 85.** Consider the following statements regarding Scanning Electron Microscopy (SEM):
1. SEM provides high-resolution images of surface morphology.
  2. SEM has a greater depth of field than optical microscopy.
  3. SEM uses electrons instead of visible light.
  4. SEM is commonly used to study the morphology of nanoparticles.
- Which of the following is correct?
- (A) 1 and 2 only
  - (B) 2 and 3 only
  - (C) 1, 2 and 3 only
  - (D) 1, 2, 3 and 4

86. The octanol-water partition coefficient ( $K_{ow}$ ) of a chemical is commonly used to estimate its:
- (A) Radioactivity (B) Potential for bioaccumulation  
(C) Rate of biodegradation (D) Vapour pressure
87. In satellite remote sensing, spatial resolution refers to:
- (A) Number of spectral bands  
(B) Ability of a sensor to distinguish small objects on the Earth's surface  
(C) Frequency of satellite revisit  
(D) Electromagnetic wavelength range
88. The Redfield ratio ( $C:N:P = 106:16:1$ ) is primarily used to evaluate:
- (A) Soil fertility (B) Nutrient balance in aquatic ecosystems  
(C) Atmospheric composition (D) Compost quality
89. **Assertion (A):** Microplastics have emerged as a significant environmental concern.  
**Reason (R):** Microplastics adsorb persistent organic pollutants and may transfer them through aquatic food webs.
- (A) Both A and R are true, and R is the correct explanation.  
(B) Both A and R are true, but R is not the correct explanation.  
(C) A is true, but R is false.  
(D) A is false, but R is true.
90. Which one of the following greenhouse gases has the highest radiative efficiency per molecule?
- (A) Carbon dioxide (B) Methane  
(C) Sulfur hexafluoride (D) Nitrous oxide
91. Which of the following best describes the Planetary Boundary concept?
- (A) It defines the political boundaries for environmental governance.  
(B) It identifies limits within which humanity can safely operate without causing irreversible environmental change.  
(C) It estimates the carrying capacity of individual ecosystems only.  
(D) It measures the economic cost of environmental degradation.

92. Which diversity index is least affected by rare species and gives greater weight to dominant species?
- (A) Shannon–Wiener Index (B) Margalef Index  
(C) Simpson's Diversity Index (D) Menhinick Index
93. Which analytical technique provides the highest sensitivity (ppb–ppt range) for trace metal analysis in environmental samples?
- (A) Graphite Furnace Atomic Absorption Spectroscopy (GF-AAS)  
(B) ICP–OES  
(C) ICP–MS  
(D) X-Ray Fluorescence Spectroscopy (XRF)
94. Microplastics are considered an emerging environmental contaminant mainly because they:
- (A) Readily dissolves in freshwater ecosystems.  
(B) Are rapidly mineralized by microorganisms.  
(C) Persist in the environment and adsorb organic pollutants and heavy metals.  
(D) Increase dissolved oxygen concentration in aquatic systems.
95. Which of the following best explains the term ecological footprint?
- (A) Total biomass produced by an ecosystem annually  
(B) Area of biologically productive land and water required to sustain a population's resource consumption and waste generation  
(C) Total carbon stored in vegetation  
(D) Area occupied by protected forests
96. Which one of the following instruments is most appropriate for identifying the functional groups present in an unknown environmental contaminant?
- (A) ICP-MS  
(B) Fourier Transform Infrared Spectroscopy  
(C) Atomic Absorption Spectroscopy  
(D) Gas Chromatography

- 97.** Which of the following is the best indicator species for assessing long-term sulfur dioxide pollution in an ecosystem?
- (A) Earthworms (B) Lichens  
(C) Blue-green algae (D) Protozoa
- 98.** According to the Competitive Exclusion Principle, two species occupying the same ecological niche:
- (A) Can coexist indefinitely without competition.  
(B) Will always evolve into mutualistic species.  
(C) Cannot coexist permanently if they compete for the same limiting resource.  
(D) Always increase biodiversity.
- 99.** A biogas plant produces  $240 \text{ m}^3$  of biogas per day, containing 60% methane. The volume of methane produced daily is:
- (A)  $96 \text{ m}^3$  (B)  $120 \text{ m}^3$   
(C)  $144 \text{ m}^3$  (D)  $180 \text{ m}^3$
- 100.** Consider the following statements regarding Environmental Impact Assessment (EIA):
1. EIA identifies likely environmental impacts before project implementation.
  2. Public consultation is an important component of the EIA process.
  3. Environmental monitoring is generally carried out after project approval to verify compliance.
  4. EIA completely eliminates environmental impacts from development projects.
- Which of the following is correct?
- (A) 1 and 2 only (B) 1, 2 and 3 only  
(C) 2, 3 and 4 only (D) 1, 2, 3 and 4

## ROUGH WORK