

Basics of Environment and Pollution Control: 100 MCQs

- **Target Exam: RRB Junior Engineer (RRB JE)**
- **Study Notes Prepared for: Entri App Users**

Part 1: Basic Environmental Concepts & Ecosystems (1–25)

1. What is the fundamental functional unit of the biosphere?

- A) Community
- B) Ecosystem
- C) Population
- D) Biome

Answer: B

2. Which atmospheric layer contains the ozone layer that absorbs harmful UV radiation?

- A) Troposphere
- B) Stratosphere
- C) Mesosphere
- D) Thermosphere

Answer: B

3. Organisms that produce their own food using sunlight are called:

- A) Heterotrophs
- B) Autotrophs
- C) Saprotrophs
- D) Phagotrophs

Answer: B

4. What percentage of energy is typically transferred from one trophic level to the next in an ecosystem?

- A) 1%
- B) 10%
- C) 50%
- D) 90%

Answer: B

5. The process by which water vapor turns into liquid water in the atmosphere is:

- A) Evaporation
- B) Transpiration
- C) Condensation
- D) Sublimation

Answer: C

6. Which biogeochemical cycle does NOT feature a prominent gaseous atmospheric phase?

- A) Carbon cycle
- B) Nitrogen cycle
- C) Phosphorus cycle

D) Oxygen cycle

Answer: C

7. The non-living components of an ecosystem are referred to as:

A) Biotic factors

B) Abiotic factors

C) Ecological niches

D) Trophic structures

Answer: B

8. Which gas makes up approximately 78% of Earth's atmosphere by volume?

A) Oxygen

B) Carbon Dioxide

C) Nitrogen

D) Argon

Answer: C

9. The term "Ecology" was first coined by:

A) Charles Darwin

B) Ernst Haeckel

C) Arthur Tansley

D) E.O. Wilson

Answer: B

10. A linear sequence showing how energy is transferred from one organism to another is a:

A) Food web

B) Food chain

C) Ecological pyramid

D) Trophic level

Answer: B

11. Which organism acts as a primary decomposer in forest soils?

A) Earthworms

B) Fungi

C) Herbivores

D) Protozoa

Answer: B

12. Plants release water vapor into the atmosphere through small openings called stomata via:

A) Percolation

B) Transpiration

C) Precipitation

D) Infiltration

Answer: B

13. What ecological concept refers to the specific role and position a species holds in its environment?

A) Habitat

B) Biome

C) Ecological Niche

D) Ecotone

Answer: C

14. The transition zone between two distinct biological communities is called an:

A) Ecozone

B) Ecotone

C) Edge effect

D) Ecosystem

Answer: B

15. Biomass pyramids are inverted in which type of ecosystem?

A) Forest ecosystem

B) Grassland ecosystem

C) Marine/Aquatic ecosystem

D) Desert ecosystem

Answer: C

16. Which process converts atmospheric nitrogen into ammonia or nitrate usable by plants?

A) Nitrification

B) Denitrification

C) Nitrogen Fixation

D) Ammonification

Answer: C

17. Bacteria that return nitrogen gas (N_2) to the atmosphere are involved in:

A) Nitrogen Fixation

B) Denitrification

C) Nitrification

D) Assimilation

Answer: B

18. What is the major source of carbon for terrestrial autotrophs?

A) Soil organic matter

B) Dissolved oceanic carbonates

C) Atmospheric Carbon Dioxide

D) Fossil fuel deposits

Answer: C

19. Which ecosystem has the highest net primary productivity (*NPP*) per unit area?

A) Open ocean

B) Tropical rainforest

C) Savanna

D) Tundra

Answer: B

20. Organisms that feed on dead organic matter are called:

A) Carnivores

B) Detritivores

C) Herbivores

D) Omnivores

Answer: B

21. The maximum population size an environment can sustainably support is known as its:
- A) Carrying Capacity
 - B) Biotic Potential
 - C) Environmental Resistance
 - D) Growth Factor

Answer: A

22. Primary succession occurs in areas where:
- A) Fires have destroyed existing vegetation
 - B) Forest clearing took place
 - C) No soil or organic substrate previously existed
 - D) Floods removed topsoil

Answer: C

23. Species that colonize a barren habitat during ecological succession are called:
- A) Climax species
 - B) Keystone species
 - C) Pioneer species
 - D) Indicator species

Answer: C

24. A species whose removal causes a drastic change in the structure of an entire ecosystem is a:
- A) Flagship species
 - B) Umbrella species
 - C) Keystone species
 - D) Exotic species

Answer: C

25. The total dry weight of all living organisms in a given area at a specific time is:
- A) Biomass
 - B) Yield
 - C) Trophic level
 - D) Net primary product

Answer: A

Part 2: Air Pollution & Noise Pollution (26–50)

26. Which gas is considered a primary air pollutant directly emitted from combustion sources?
- A) Ozone (O_3)
 - B) Sulfur Dioxide (SO_2)
 - C) PAN (Peroxyacetyl nitrate)
 - D) Sulfuric Acid (H_2SO_4)

Answer: B

27. Photochemical smog is formed primarily by the interaction of sunlight with:
- A) CO_2 and SO_2

B) Nitrogen Oxides (NO_x) and Volatile Organic Compounds (VOCs)

C) Lead and particulate matter

D) Carbon Monoxide and water vapor

Answer: B

28. Which device is commonly installed in industrial chimneys to remove particulate matter using electrostatic charges?

A) Scrubber

B) Cyclone Separator

C) Electrostatic Precipitator (ESP)

D) Catalytic Converter

Answer: C

29. Carbon Monoxide (CO) is dangerous to human health because it binds to hemoglobin to form:

A) Oxyhemoglobin

B) Carboxyhemoglobin

C) Methemoglobin

D) Carbaminohemoglobin

Answer: B

30. Acid rain is primarily caused by emissions of which two atmospheric pollutants?

A) CO_2 and CH_4

B) SO_2 and NO_x

C) CFCs and Ozone

D) Lead and Particulate Matter

Answer: B

31. Catalytic converters in modern motor vehicles reduce emissions by converting Carbon Monoxide (CO) and Hydrocarbons into:

A) NO_2 and Water

B) CO_2 and Water

C) SO_2 and Carbon

D) N_2 and Ozone

Answer: B

32. Which device uses liquid spray to scrub gaseous pollutants like SO_2 from flue gas?

A) Baghouse Filter

B) Wet Scrubber

C) Cyclone Collector

D) Settling Chamber

Answer: B

33. Particulate matter equal to or smaller than what aerodynamic diameter (PM) poses the greatest health risk deep in human lungs?

A) PM_{100}

B) PM_{50}

C) $PM_{2.5}$

D) PM_{25}

Answer: C

34. Sound pressure levels are standardly measured using which logarithmic scale unit?

A) Hertz (Hz)

B) Decibels (dB)

C) Lux (lx)

D) Joules (J)

Answer: B

35. According to standard WHO guidelines, continuous exposure to noise above what level causes auditory damage?

A) 45 dB

B) 60 dB

C) 85 dB

D) 120 dB

Answer: C

36. Green muffler refers to the practice of planting trees along roadsides to mitigate:

A) Air pollution

B) Soil erosion

C) Noise pollution

D) Water pollution

Answer: C

37. What secondary air pollutant causes eye irritation in photochemical smog?

A) Carbon Monoxide

B) Peroxyacetyl Nitrate (PAN)

C) Sulfur Dioxide

D) Nitric Oxide

Answer: B

38. The phenomenon where temperature increases with altitude, trapping air pollutants near the ground, is:

A) Thermal Lapse Rate

B) Thermal Inversion

C) Adiabatic Compression

D) Greenhouse Heating

Answer: B

39. What metal additive was historically added to gasoline as an anti-knock agent, leading to widespread atmospheric contamination?

A) Cadmium

B) Mercury

C) Lead

D) Arsenic

Answer: C

40. Fabric filters used to remove dry particulate matter from industrial flue gases are commonly known as:

- A) Wet scrubbers
- B) Baghouses
- C) Venturi scrubbers
- D) Electrostatic plates

Answer: B

41. Which gas is responsible for the classic "rotten egg" odor near anaerobic decomposition sites?

- A) Ammonia (NH_3)
- B) Hydrogen Sulfide (H_2S)
- C) Sulfur Dioxide (SO_2)
- D) Methane (CH_4)

Answer: B

42. What standard unit is used to express the frequency of sound waves?

- A) Decibel
- B) Hertz
- C) Pascal
- D) Watt

Answer: B

43. Which pollutant is tested using the Ringelmann scale?

- A) Smoke density
- B) Noise intensity
- C) Water turbidity
- D) Radiation dosage

Answer: A

44. Taj Mahal's marble structure is vulnerable to acid deposition due to marble reacting with sulfuric acid. This phenomenon is called:

- A) Marble Cancer
- B) Corrosion Decay
- C) Stone Frosting
- D) Acid Oxidation

Answer: A

45. Ground-level ozone is classified as a:

- A) Primary pollutant
- B) Secondary pollutant
- C) Tertiary pollutant
- D) Non-toxic gas

Answer: B

46. Suspended Particulate Matter (*SPM*) is collected for analysis using which ambient air sampling instrument?

- A) Spectrophotometer
- B) High-Volume Air Sampler

- C) Gas Chromatograph
- D) Flame Photometer

Answer: B

47. What airborne mineral fiber, historically used in construction insulation, causes lung cancer and mesothelioma?

- A) Quartz
- B) Asbestos
- C) Silica
- D) Mica

Answer: B

48. Indoor air pollution in developing nations is largely caused by burning:

- A) Kerosene stoves
- B) Biomass fuels (wood, dung)
- C) Natural gas
- D) Coal gas

Answer: B

49. Noise pollution regulations usually specify separate permissible decibel limits for daytime and nighttime. The permissible daytime limit for a quiet/hospital zone is generally around:

- A) 35 dB
- B) 50 dB
- C) 75 dB
- D) 90 dB

Answer: B

50. Settling chambers use which physical force to separate heavy particulates from exhaust gas streams?

- A) Centrifugal force
- B) Electrostatic force
- C) Gravity
- D) Magnetic force

Answer: C

Part 3: Water Pollution & Wastewater Treatment (51–75)

51. Biochemical Oxygen Demand (*BOD*) measures the amount of oxygen required by:

- A) Fish to survive in aquatic habitats
- B) Aerobic microorganisms to decompose organic matter in water
- C) Chemical oxidants to breakdown all inorganic contaminants
- D) Aquatic plants for photosynthesis

Answer: B

52. The enrichment of a body of water with nutrients, leading to excessive algal growth, is termed:

- A) Biomagnification
- B) Eutrophication

- C) Bioaccumulation
- D) Salinization

Answer: B

53. Which toxic chemical was responsible for Minamata disease in Japan due to fish contamination?

- A) Cadmium
- B) Lead
- C) Methylmercury
- D) Arsenic

Answer: C

54. Chemical Oxygen Demand (*COD*) is typically higher than Biochemical Oxygen Demand (*BOD*) for a wastewater sample because:

- A) *COD* measures both biodegradable and non-biodegradable organic matter
- B) *COD* measures only inorganic minerals
- C) *BOD* takes longer to react
- D) Microorganisms consume more oxygen than chemicals

Answer: A

55. Itai-itai disease was caused by long-term environmental poisoning from which heavy metal?

- A) Mercury
- B) Cadmium
- C) Arsenic
- D) Chromium

Answer: B

56. In primary sewage treatment, floating debris and large solids are removed by:

- A) Trickling filters
- B) Screening and Sedimentation
- C) Activated Sludge process
- D) Chlorination

Answer: B

57. The secondary stage of wastewater treatment is predominantly a:

- A) Physical process
- B) Biological process
- C) Chemical process
- D) Mechanical process

Answer: B

58. What parameter indicates the clarity or cloudiness of a water sample?

- A) pH
- B) Turbidity
- C) Hardness
- D) Dissolved Oxygen (*DO*)

Answer: B

59. Excess nitrates in drinking water can cause which condition in infants?

- A) Fluorosis

- B) Blue Baby Syndrome (Methemoglobinemia)
- C) Minamata disease
- D) Skeletal deformities

Answer: B

60. High concentrations of fluoride in drinking water ($> 1.5 \text{ mg/L}$) primarily affect which body parts?
- A) Liver and kidneys
 - B) Teeth and bones
 - C) Lungs and heart
 - D) Skin and hair

Answer: B

61. Which standard test measures the biological contamination and presence of pathogenic bacteria in water?
- A) *BOD* test
 - B) Total Coliform / Fecal Coliform test
 - C) Jar test
 - D) *COD* test

Answer: B

62. What chemical compound is widely used for primary disinfection of public municipal water supplies?
- A) Ozone
 - B) Chlorine
 - C) Ultraviolet light
 - D) Alum

Answer: B

63. The process of adding alum (aluminum sulfate) to water to combine fine suspended particles into larger settleable aggregates is called:
- A) Flocculation and Coagulation
 - B) Filtration
 - C) Aeration
 - D) Sedimentation

Answer: A

64. What happens to the Dissolved Oxygen (*DO*) level in a river immediately downstream of a raw sewage discharge point?
- A) It increases dramatically
 - B) It drops sharply (Oxygen sag curve)
 - C) It remains completely unchanged
 - D) It fluctuates continuously

Answer: B

65. Biomagnification refers to:
- A) Accumulation of nutrients in lakes
 - B) Increasing concentration of persistent toxins at higher trophic levels
 - C) Growth of bacterial colonies in wastewater

D) Magnification of microscopic organisms under light microscopes

Answer: B

66. Blackfoot disease is caused by chronic exposure to high levels of which metalloid in groundwater?

- A) Fluoride
- B) Arsenic
- C) Lead
- D) Nitrate

Answer: B

67. An anaerobic secondary wastewater treatment process that utilizes a fixed bed of gravel or plastic media covered with biofilm is a:

- A) Activated Sludge process
- B) Trickling Filter
- C) Oxidation Pond
- D) Clarifier

Answer: B

68. Hardness in water is primarily caused by dissolved salts of which two cations?

- A) Sodium and Potassium
- B) Calcium and Magnesium
- C) Iron and Manganese
- D) Copper and Zinc

Answer: B

69. What is the standard temperature and incubation period for a standard 5-day *BOD* test?

- A) 20°C for 5 days
- B) 37°C for 5 days
- C) 25°C for 3 days
- D) 100°C for 2 hours

Answer: A

70. Which natural aquatic plant is famous for rapid unchecked growth in nutrient-rich waters, often called the "Terror of Bengal"?

- A) Duckweed
- B) Water Hyacinth
- C) Hydrilla
- D) Water Lily

Answer: B

71. Thermal pollution in natural water bodies generally results in:

- A) Increased dissolved oxygen levels
- B) Decreased dissolved oxygen levels and thermal stress on fish
- C) Reduced algal blooms
- D) Lower chemical reaction rates

Answer: B

72. Reverse Osmosis (*RO*) purifies water by forcing it across a semi-permeable membrane against natural osmotic pressure using:

- A) Gravity

- B) External high pressure
- C) Chemical catalysts
- D) Electrical potential

Answer: B

73. The sludge produced during secondary wastewater treatment that is recycled back into the aeration tank is known as:
- A) Primary sludge
 - B) Activated sludge
 - C) Digestate
 - D) Septic sludge

Answer: B

74. Oil spills on ocean surface waters are often remediated biologically using bacteria through a process called:
- A) Bioaccumulation
 - B) Bioremediation
 - C) Phytoremediation
 - D) Biomagnification

Answer: B

75. What indicator parameter measures the organic carbon content in water through thermal oxidation?
- A) *BOD*
 - B) *COD*
 - C) *TOC* (Total Organic Carbon)
 - D) *TDS* (Total Dissolved Solids)

Answer: C

Part 4: Waste Management, Global Issues & Legislation (76–100)

76. Which greenhouse gas has the highest global warming potential (*GWP*) per molecule over a 100-year timescale among the following?
- A) Carbon Dioxide (CO_2)
 - B) Methane (CH_4)
 - C) Nitrous Oxide (N_2O)
 - D) Sulfur Hexafluoride (SF_6)

Answer: D

77. The Montreal Protocol (1987) was signed internationally to control and phase out emissions of:
- A) Greenhouse gases
 - B) Ozone Depleting Substances (ODSs) like CFCs
 - C) Hazardous electronic waste
 - D) Persistent Organic Pollutants (POPs)

Answer: B

78. The primary international treaty aimed at reducing greenhouse gas emissions to combat global climate change, adopted in 1997, was the:

- A) Kyoto Protocol
- B) Basel Convention
- C) Ramsar Convention
- D) Stockholm Convention

Answer: A

79. The liquid that drains or "leaches" from a solid waste landfill and contains dissolved contaminants is called:

- A) Slurry
- B) Leachate
- C) Effluent
- D) Permeate

Answer: B

80. The 3 Rs of sustainable waste management stand for:

- A) Reclaim, Refine, Resell
- B) Reduce, Reuse, Recycle
- C) Remove, Replace, Restore
- D) Recover, Reheat, Reuse

Answer: B

81. The Basel Convention primarily regulates:

- A) Protection of wetlands of international importance
- B) Transboundary movement and disposal of hazardous wastes
- C) Trade in endangered species
- D) Emission of greenhouse gases

Answer: B

82. Hazardous e-waste typically contains toxic heavy metals like:

- A) Sodium and Potassium
- B) Lead, Mercury, and Cadmium
- C) Iron and Calcium
- D) Magnesium and Zinc

Answer: B

83. Which high-temperature thermal process breaks down hazardous waste in the absence of oxygen?

- A) Incineration
- B) Pyrolysis
- C) Composting
- D) Gasification with excess air

Answer: B

84. The international agreement protecting wetlands of global importance, signed in 1971, is the:

- A) Stockholm Convention
- B) Ramsar Convention
- C) Vienna Convention

D) CITES Agreement

Answer: B

85. Vermicomposting breaks down organic waste using:

A) Anaerobic bacteria

B) Earthworms

C) Fungi cultures

D) Algae

Answer: B

86. Synthetic chemicals like DDT and PCBs resist environmental degradation and accumulate in biological tissues; they are classified as:

A) Volatile Organic Compounds (VOCs)

B) Persistent Organic Pollutants (POPs)

C) Biodegradable pollutants

D) Inorganic nutrients

Answer: B

87. Biological decomposition of organic waste in the presence of oxygen to produce nutrient-rich soil conditioner is called:

A) Pyrolysis

B) Composting

C) Landfilling

D) Incineration

Answer: B

88. Which international treaty limits organic hazardous chemicals known as POPs?

A) Stockholm Convention

B) Minamata Convention

C) Rotterdam Convention

D) Paris Agreement

Answer: A

89. Controlled thermal destruction of waste at high temperatures ($>850^{\circ}\text{C}$) in the presence of excess oxygen is:

A) Pyrolysis

B) Incineration

C) Torrefaction

D) Vitrification

Answer: B

90. The Minamata Convention on Mercury was adopted globally to regulate exposure to:

A) Lead emissions

B) Mercury compounds

C) Cadmium mining waste

D) Radioactive waste

Answer: B

91. Ozone depletion in the stratosphere leads to increased surface levels of which harmful solar radiation?

A) Infrared radiation

- B) Ultraviolet-B (UV-B) radiation
- C) X-rays
- D) Microwave radiation

Answer: B

92. Synthetic refrigerants developed as replacements for CFCs that do not deplete ozone but act as potent greenhouse gases are:
- A) Halons
 - B) Hydrofluorocarbons (HFCs)
 - C) Hydrochlorofluorocarbons (HCFCs)
 - D) Carbon Tetrachloride

Answer: B

93. What term describes using living green plants to clean up contaminated environments like soils and water?
- A) Bioaugmentation
 - B) Phytoremediation
 - C) Biostimulation
 - D) Composting

Answer: B

94. What principal gas is produced during anaerobic digestion in landfills and biogas reactors?
- A) Carbon Monoxide
 - B) Methane
 - C) Nitrogen
 - D) Oxygen

Answer: B

95. Extended Producer Responsibility (*EPR*) is a key policy approach in waste management for:
- A) Agriculture waste
 - B) E-waste and plastic packaging
 - C) Biomedical waste
 - D) Nuclear waste

Answer: B

96. Biomedical waste contaminated with human anatomical parts or biological fluids is standardly color-coded for disposal in:
- A) Yellow bags/containers
 - B) Blue boxes
 - C) Black bins
 - D) Green bags

Answer: A

97. The process of converting waste materials into new materials of higher quality or environmental value is called:
- A) Downcycling
 - B) Upcycling
 - C) Incineration

D) Landfilling

Answer: B

98. The phenomenon where an urban area is significantly warmer than its surrounding rural areas due to human activities and infrastructure is the:

A) Greenhouse Effect

B) Urban Heat Island Effect

C) Global Warming anomaly

D) Thermal Inversion

Answer: B

99. CITES is an international agreement regulating global trade in:

A) Toxic chemicals

B) Endangered species of wild fauna and flora

C) Hazardous industrial waste

D) Ozone-depleting gases

Answer: B

100. Which national park in India, famous as the last refuge of the Bengal tiger and a UNESCO World Heritage Site, contains the world's largest mangrove forest ecosystem?

A) Kaziranga National Park

B) Sundarbans National Park

C) Jim Corbett National Park

D) Gir National Park

Answer: B