Question 1: A coastal city plans a mangrove restoration to reduce storm surge risk and support fisheries. Which ecological benefit is most directly expected from restored mangroves?
a) Increased deep-ocean biodiversity hundreds of km offshore
b) Attenuation of wave energy and provision of nursery habitat for juvenile fish
c) Immediate increase in freshwater availability inland
d) Complete elimination of all local pollution sources

Question 2: A farm manager must decide between composting and sending crop residues to landfill. Which environmental advantage is provided specifically by composting (compared to landfilling)?
a) Permanent sequestration of carbon for millennia
b) Conversion of organic waste into a stabilized soil amendment while reducing methane emissions from decomposition
c) Elimination of the need for crop fertilization forever
d) Instant increase in crop yields within one day

Question 3: A power company proposes a new onshore wind farm. Which metric best assesses its long-term contribution to climate mitigation?
a) Number of turbines only
b) Lifetime greenhouse gas emissions avoided per MWh (life-cycle GHG savings)
c) Height of each turbine tower only
d) Total area occupied in hectares regardless of output

Question 4: A river downstream of a manufacturing cluster shows high nitrate and low dissolved oxygen. Which combined action is most appropriate to address both pollution and ecosystem health?
a) Divert the river permanently to another channel and ignore pollution sources
b) Implement riparian buffer strips, regulate effluent nitrogen, and restore in-stream habitat to improve oxygenation
c) Increase fishing to remove stressed species quickly
d) Build taller factory chimneys

Question 5: Which greenhouse gas has the highest global warming potential per unit mass over a 100-year horizon?
a) Carbon dioxide (CO_2)
b) Nitrous oxide (N_2O)
c) Water vapour
d) Oxygen (O_2)

Question 6: In a life-cycle assessment comparing solar PV and coal electricity, which stage often contributes most to coal's higher total greenhouse gas emissions?
a) Equipment packaging
b) Fuel extraction and combustion (mining and burning coal)
c) Manufacturing of crystalline silicon only
d) Retail marketing

Question 7: A student measures species richness in two forest patches of equal area. Patch A has 20 species; Patch B has 20 species but with very uneven abundances (one species dominates). Which index will reflect the difference in evenness most directly?
a) Species richness only
b) Simpson's diversity index or Shannon index (which account for abundance evenness)
c) Total biomass only
d) Soil pH only

Question 8: Which renewable energy source typically has the highest capacity factor (i.e., actual output as fraction of rated capacity) at well-sited, utility-scale installations?
a) Rooftop solar panels in a temperate city
b) Onshore wind farm at moderate-wind site
c) Hydroelectric dam with large reservoir (well-sited)
d) Small urban photovoltaics on a shaded roof

Question 9: Air quality monitors detect elevated $PM_{2.5}$; public-health officials issue an advisory. Which immediate recommended action best reduces population exposure?
a) Encourage outdoor sporting events to continue as planned
b) Advise vulnerable groups to stay indoors with windows closed and use filtration, and limit heavy exertion outdoors
c) Issue a warning to increase industrial emissions limit temporarily
d) Switch all monitoring stations off to avoid alarming people

Question 10: Which goal is specifically one of the UN Sustainable Development Goals (SDGs)?
a) Reduce taxation for corporations universally
b) Clean water and sanitation (SDG 6)
c) Mandate a single global currency
d) Abolish national parks

Question 11: A coastal wetland shows both plant die-off and increased algal blooms offshore. Which combination of upstream actions most likely addresses both symptoms?
a) Increase fertilizer application in upstream agriculture, and build seawalls
b) Reduce agricultural nutrient runoff (best management practices) and restore upstream wetlands that filter nutrients
c) Intensify upstream irrigation only
d) Dredge offshore reefs continuously

Question 12: Which pollutant is most associated with acid rain and originates primarily from fossil fuel combustion?
a) Nitrogen and sulphur oxides (NO_x and SO_2)
b) Ozone (O_3) formed only in the stratosphere
c) Inert nitrogen gas (N_2)
d) Helium (He)

Question 13: A municipal recycling program can improve diversion by adding curbside food waste pickup. Which process for collected food waste typically produces renewable energy while stabilizing organic matter?
a) Incineration without energy recovery
b) Anaerobic digestion producing biogas and digestate used as soil amendment
c) Immediate ocean dumping
d) Landfilling in an uncovered pit

Question 14: Which factor most increases the albedo effect locally and helps reduce urban heat islands?
a) Using dark asphalt for more heat absorption
b) Installing cool (high-reflectance) roofs and increasing tree canopy cover
c) Removing all vegetation to create more concrete plazas
d) Increasing night-time street lighting intensity

Question 15: A researcher measuring soil carbon uses convenience sampling only near tree trunks. Why might this bias the estimate of whole-field soil carbon?
a) Because tree-trunk soils are identical across landscapes
b) Convenience sampling near trunks overestimates mean soil carbon because these microsites often store more organic matter than open areas; random or stratified sampling would be less biased
c) It always underestimates soil carbon by a fixed amount
d) Soil carbon does not vary spatially so sampling location is irrelevant

Question 16: Which technology directly converts kinetic energy of flowing water into electricity with minimal emissions?
a) Diesel generators driven by water trucks
b) Hydropower turbines in a run-of-river or reservoir system
c) Open burning of wood near rivers
d) Solar panels placed in the water without electrical connections

Question 17: A city's landfill gas is being flared; community advocates ask for better use. What is the most sustainable next step?
a) Continue flaring because nothing else is possible
b) Capture and use methane from landfill gas in a combined heat-and-power (CHP) system or upgrade it to pipeline-quality biomethane if feasible
c) Release gas uncombusted into atmosphere to avoid local smells
d) Move landfill into surrounding wetlands

Question 18: Which human activity contributes most to the increase in atmospheric CO_2 concentrations since the industrial revolution?
a) Planting urban trees globally
b) Burning fossil fuels for energy and transportation plus land-use change
c) Photosynthesis in crops
d) Growing household gardens

Question 19: Which method is most effective for preventing plastic microbeads from entering aquatic ecosystems?
a) Increase single-use plastic production
b) Ban microbeads in cosmetics and require alternative abrasive materials, plus improve wastewater treatment capture technologies
c) Encourage people to throw cosmetics into rivers directly
d) Reduce wastewater treatment facilities to save money

Question 20: A coastal fish species shows range shift poleward over decades. Which driver most likely explains this shift?
a) Decrease in predator numbers only
b) Increasing sea surface temperatures altering suitable thermal habitat ranges
c) Sudden change in moon phases
d) Random daily weather variation only

Question 21: Which of the following is a primary objective of integrated waste management?
a) Maximize landfill volume as the sole strategy
b) Reduce, reuse, recycle, and recover energy where appropriate, prioritizing waste prevention
c) Export all waste overseas without treatment
d) Burn all waste in open pits

Question 22: In climate science, 'radiative forcing' describes:
a) The influence of a factor (like greenhouse gases or aerosols) on the balance between incoming solar radiation and outgoing infrared radiation
b) How loud storms force radiation to move faster
c) The force needed to start a nuclear reactor
d) The amount of solar sails required for satellites

Question 23: A rural school wants a reliable renewable electricity source with minimal maintenance. Which option is most suitable for many remote locations with good sun and low maintenance capacity?
a) Small wind turbines with complex gearboxes everywhere
b) Solar PV with battery storage sized for critical loads and simple charge controllers, combined with local community training for basic upkeep
c) Import diesel generators fuelled by distant trucks every day
d) Hydroelectric dams in tiny seasonal streams without storage

Question 24: Which practice reduces eutrophication risk in lakes fed by agricultural runoff?
a) Increase fertilizer application right up to streams
b) Implement buffer strips, cover cropping, and controlled fertilizer application to limit nutrient runoff
c) Remove fish species that graze algae only
d) Pump lake water into drinking bottles directly

Question 25: Which SDG specifically focuses on affordable and clean energy?
a) SDG 1
b) SDG 7
c) SDG 13
d) SDG 15

Question 26: Which pollutant is most directly responsible for photochemical smog in urban areas on sunny days?
a) Nitrogen oxides (NO_x) and volatile organic compounds (VOCs) reacting to form ozone at ground level
b) Carbon monoxide only at night
c) Inert argon gas
d) Sulphur - free oxygen

Question 27: A product design team wants to minimize embodied carbon. Which material selection strategy is most effective?
a) Use highest-density metals arbitrarily
b) Choose low-carbon materials, design for durability and reparability, and minimize unnecessary material use
c) Make products single-use for novelty
d) Hide material origin from supply-chain audits

Question 28: Which renewable energy source has the smallest land footprint per unit energy generated at utility scale?
a) Solar PV in distributed rooftops always
b) Offshore wind (well – sited)
c) Incineration with no energy recovery
d) Open-air biomass burning across large croplands

Question 29: A municipal composting program reports lower methane emissions compared to landfilling. Why does composting reduce methane?
a) Composting is fully anaerobic and generates more methane than landfilling
b) Aerobic composting fosters decomposition pathways that produce CO_2 rather than methane, reducing methane emissions compared to anaerobic decomposition in landfills
c) Composting magically neutralizes greenhouse gases
d) Landfills always have zero methane

Question 30: Which index is most appropriate to measure a country's progress toward multiple SDGs in a composite way?
a) A single GDP number alone
b) A multi-metric index that aggregates indicators across relevant SDGs
c) Counting only the number of policies passed regardless of implementation
d) Number of social media posts about sustainability

Question 31: A coastal community considers restoring oyster reefs to improve water quality. Which ecological mechanism best explains expected water clarity improvement?
a) Oysters are top predators that eat other fish reducing turbidity
b) Filter-feeding by oysters removes suspended particles and phytoplankton, improving water clarity and nutrient cycling
c) Oysters increase sediment resuspension always
d) Oyster shells evaporate pollutants instantly

Question 32: Which climate mitigation action has most potential to directly reduce methane emissions from agriculture?
a) Increasing ruminant livestock population without feed changes
b) Improving manure management and altering livestock diets to reduce enteric fermentation
c) Allowing unmanaged manure to decompose in open lagoons
d) Feeding animals only high-sugar treats

Question 33: Which waste-management process recovers metals from electronic waste most effectively at scale?
a) Manual dismantling followed by hydrometallurgical or pyrometallurgical recovery processes designed for e-waste
b) Burning e-waste in open fires to melt metals free
c) Burying electronics in compost piles
d) Tossing e-waste into consumer recycling bins without sorting

Question 34: Which agricultural land - management practice most contributes to long-term soil carbon sequestration?
a) Intensive tillage every season
b) No-till or reduced-till combined with cover cropping and crop rotation to build soil organic matter
c) Continuous monoculture with synthetic fertilizer only
d) Removing all organic residues from fields

Question 35: A life-cycle comparison shows that recycled aluminium uses ~95% less energy than primary aluminium made from bauxite. Which action most directly increases availability of recycled aluminium feedstock?
a) Export used beverage cans to landfill
b) Implement efficient curbside collection and deposit-return schemes to increase recovery rates
c) Bury aluminium in landfills intentionally
d) Ban aluminium recycling facilities

Question 36: A city experiences frequent flooding because of clogged drains with plastic waste. Which combination of policy and behaviour change is most effective short-term and long-term?
a) Short-term: organized clean-up and prompt removal of debris; Long-term: reduce plastic use, improve waste collection infrastructure, and install litter traps at drainage inlets
b) Short-term: ignore problem; Long-term: increase single-use plastic distribution
c) Short-term: fill drains with concrete; Long-term: build taller buildings only
d) Short-term: sprinkle salt; Long-term: ban all outdoor activities

Question 37: Which pollutant is commonly targeted by catalytic converters in vehicle exhausts?
a) Nitrogen oxides (NO_x), carbon monoxide (CO), and unburned hydrocarbons — catalytic converters reduce these pollutants
b) Pure argon gas only
c) Water vapour removal exclusively
d) Adding more lead

Question 38: Which strategy best increases social acceptance of a new wind farm project?
a) Exclude local stakeholders from planning to speed approval
b) Early community engagement, transparent benefit-sharing (e.g., local jobs, community funds), and clear environmental impact mitigation plans
c) Surprise residents with construction before consultation
d) Promise unlimited compensation without feasibility

Question 39: A river's dissolved oxygen declines at night despite photosynthesis during day. What process most likely causes nocturnal DO drop?
a) Photosynthesis increasing at night
b) Respiration by aquatic organisms and decomposition consumes oxygen, causing lower DO at night
c) DO is fixed and cannot change with time
d) The moon removes oxygen at night

Question 40: Which SDG directly addresses climate action and resilience building?
a) SDG 2
b) SDG 13
c) SDG 9
d) SDG 16

Question 41: A textile factory discharges dye-laden wastewater. Which combination of treatment steps best reduces colour and chemical oxygen demand (COD) before discharge?
a) Primary sedimentation only (no further treatment)
b) Coagulation–flocculation, followed by advanced oxidation or biological treatment tailored to dye chemistry, and polishing filtration or adsorption as needed
c) Direct release into river to dilute naturally
d) Add more dye to neutralize colour

Question 42: Which energy storage technology is best suited for multi-hour grid-scale storage paired with renewables?
a) Short-duration super capacitors only
b) Pumped hydro storage or flow batteries can provide multi-hour storage and are common grid-scale solutions
c) Hand-cranked generators in households
d) Single AA batteries in series

Question 43: Which metric best indicates biodiversity health in a freshwater ecosystem?
a) Species composition of macro invertebrates and presence/absence of pollution-sensitive taxa
b) Number of concrete bridges over the river only
c) Frequency of tourist photos only
d) Colour of river water alone

Question 44: A national policy sets a carbon price to internalize externalities. Which economic effect is expected if designed sensibly?
a) Incentivize emissions reductions by making fossil-fuel use more expensive, encouraging low-carbon alternatives
b) Automatically eliminate all unemployment overnight
c) Make renewable energy illegal
d) Force all industries to relocate to a single city

Question 45: A company claims its plastic packaging is "compostable." Which verification step should regulators require before approving the label?
a) Accept the claim without evidence because marketing says so
b) Require standardized compostability testing (e.g., industrial composting standards), labelling that specifies conditions (industrial v/s home), and demonstration of biodegradation rates and absence of toxic residues
c) Ban all plastics immediately without testing
d) Allow only single-use descriptors

Question 46: Which intervention most effectively reduces indoor air pollution from household solid-fuel cooking in rural areas?
a) Provide improved, fuel-efficient cookstoves with chimneys and promote cleaner fuels where feasible, combined with behaviour change programs
b) Encourage open fires indoors for tradition
c) Close all windows permanently
d) Replace stoves with wood-burning bonfires in living rooms

Question 47: Which of the following is a non-renewable resource?
a) Wind
b) Coal
c) Tidal energy
d) Solar radiation

Question 48: An NGO wants to measure progress on SDG 6 in a district. Which indicator combination is most useful?
a) Percentage of population using safely managed drinking water services and percentage with access to basic sanitation and wastewater treatment coverage
b) Number of social media posts about cleanliness only
c) Number of water bottles sold
d) Total rainfall only

Question 49: Which method is most appropriate to reduce mercury contamination from artisanal gold mining?
a) Promote mercury-free gold extraction methods (e.g., gravity concentration, cyanide with safeguards) and provide training and access to safer technologies and formalization
b) Encourage widespread mercury purchase and use
c) Bury mercury in soils to hide it
d) Remove all miners and close mines without livelihood alternatives

Question 50: A city aims to increase recycling rates. Which incentive is likely most effective based on evidence?
a) Pay-as-you-throw schemes combined with convenient collection and clear sorting guidance
b) Raise garbage taxes indiscriminately with no service changes
c) Ban all recycling programs
d) Remove recycling bins from public areas

Question 51: Which biochemical cycle is most directly involved when fertilizers applied to fields lead to increased nitrous oxide emissions?
a) The nitrogen cycle
b) The helium cycle
c) The sulphuric calendar
d) The carbon calendar

Question 52: A company develops a new biodegradable polymer. Before recommending it for wide use, which environmental test is most essential?
a) Laboratory biodegradation tests in relevant environments (soil, freshwater, marine, and industrial compost if labelled compostable) and ecotoxicity testing to ensure no harmful degradation products
b) Only a focus group on product smell
c) A colour preference survey
d) Immediate mass adoption without testing

Question 53: Which approach most reduces e-waste generation at source?
a) Design for repairability, modular upgrades, longer warranties, and right-to-repair policies to extend device lifetimes
b) Promote disposable electronics as fashion items
c) Encourage shorter device lifespans through software obsolescence only
d) Ban all electronics sales

Question 54: Which pollutant is a primary contributor to ocean dead zones near river mouths?
a) Excess nutrients driving algal blooms and subsequent hypoxia
b) Sand only
c) Saltwater intrusion only
d) Oxygen supplementation by fish

Question 55: A small island nation wants to reduce dependence on imported diesel for power generation. Which combination is most resilient and appropriate?
a) Deploy a mix of solar PV, battery storage, and demand-side management, and where feasible add wind or hybrid microgrids; invest in local capacity for maintenance
b) Expand diesel imports indefinitely
c) Remove all electricity infrastructure and rely on candles
d) Build a single massive coal plant on fragile soils

Question 56: Which statement best describes circular economy principles?
a) Keep linear take-make-dispose chains because they are efficient
b) Design out waste and pollution, keep products and materials in use, and regenerate natural systems
c) Burn everything to generate heat only
d) Replace reuse with increased consumption

Question 57: A thermal power plant proposes switching from coal to natural gas. Which near-term climate effect is likely?
a) Natural gas combustion emits less CO_2 per unit energy than coal, so CO_2 emissions fall; but methane leaks across the supply chain can offset benefits if not controlled
b) Switching guarantees immediate net-negative emissions
c) Natural gas and coal have identical climate impact always
d) Switching eliminates all air pollutants

Question 58: Which downstream recycling process recovers high-purity paper fibre for reuse?

a) Pulping and deinking with flotation or washing to remove inks and contaminants before re-pulping

b) Burning paper before processing

c) Burying paper in landfills to let it be recycled by microbes into high-purity fibre

d) Shredding paper and using as-is in metal smelting

Question 59: Which SDG explicitly targets responsible consumption and production patterns?

a) SDG 2

b) SDG 12

c) SDG 8

d) SDG 11

Question 60: A wetland restoration is proposed to improve biodiversity and carbon storage. Which monitoring metric directly indicates whether carbon is being sequestered in soils over time?

a) Soil organic carbon content measured in mass per area (e.g., tonnes C/ha) over time using standardized soil sampling and laboratory analysis

b) Number of visitors to the wetland each month

c) Colour of water only

d) Number of picnic benches