

SECTION A

PART I: Multiple Choice Questions [30 marks]

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Which of the following levels of organization is arranged in the correct sequence from most to least inclusive?
 - a) Ecosystem, community, population, individual.
 - b) Community, ecosystem, individual, population.
 - c) Individual, population, community, ecosystem.
 - d) Individual, community, population, ecosystem.

2. Which one of the following is the environmental Mitigation hierarchy?
 - a) Prevent, control and remedy.
 - b) Avoid, minimize and mitigate.
 - c) Collect data, monitor and enforce.
 - d) Consider alternative, choose and prepare Environmental Management Plan.

3. Strategic Environmental Assessment can be understood as a
 - a) systematic process for evaluating the environmental consequences of a proposed policy, program or projects.
 - b) systematic process for evaluating the environmental consequences of policy, plan or projects.
 - c) systematic process for evaluating the environmental consequences of policy, plan or program.
 - d) None of the above.

4. Which of the following is the most responsible for world water crisis?
 - a) Dams
 - b) Floods
 - c) Drought
 - d) Population growth

5. Which of the following is a biodegradable waste?
 - a) Plastics
 - b) Polythene
 - c) Non-woven bags
 - d) None of the above

6. The pollution which does not cause persistent harm to life supporting system is _____.
 - a) noise pollution
 - b) radiation pollution
 - c) organochlorine pollution
 - d) none of the above

7. Reusing or recycling old items instead of buying new ones helps shrink your carbon footprint by
 - a) eliminating the need for new packaging to be created.
 - b) cutting out the carbon dioxide when transporting new products to the store.
 - c) making sure you don't buy more than you need.
 - d) All of the above

8. Strategic Environmental Assessment in Bhutan was formally established in Bhutan_____.
 - a) 2000
 - b) 2001
 - c) 2002
 - d) 2007

9. Measure of biodiversity of an area is
 - a) the number of species found there.
 - b) the range of different life forms.
 - c) Both (a) and (b).
 - d) None of the above.

10. Which of the following factor(s) is/are responsible for degradation of soil?
 - a) Chemical fertilizers
 - b) Landslides
 - c) Floods
 - d) All of the above

11. A type of plastic that is biodegradable has been in the news. The ingredient that makes it biodegradable is_____.
 - a) Vegetable oil
 - b) Petroleum
 - c) Cornstarch
 - d) None of the Above

12. The science of weights and measures is called_____.
 - a) Metrology
 - b) Meteorology
 - c) Mineralogy
 - d) Morphology

13. Some technique (s) for removing particulates from flue gas produced from the combustion of coal is/are_____.
 - a) electrostatic precipitation
 - b) fabric filter or baghouse
 - c) wet scrubbers
 - d) All of the above

14. The most commercial nuclear power plants worldwide are cooled by:
 - a) Sodium
 - b) Mercury
 - c) Helium
 - d) Water

15. The study of poisons is called:
- Oncology
 - Toxicology
 - Phrenology
 - None of the above
16. Which of the following is **NOT** a major pollutant from automobiles?
- Carbon dioxide
 - Unburned hydrocarbons
 - Nitrous oxide
 - Sulfur dioxide
17. The most serious environmental pollution from a nuclear reactor is:
- Radioactivity
 - Particulate formation
 - Thermal pollution
 - None of the above
18. Which two gases are used to disinfect water in sewage treatment facilities?
- Helium and nitrogen
 - Ozone and chlorine
 - Oxygen and hydrogen
 - Nitrogen and chlorine
19. The estrogen and androgen hormones which regulate sexual development and function are structurally related to:
- Beta carotene
 - Ethanol
 - Adrenaline
 - Cholesterol
20. Compared to terrestrial environment, aquatic environments are more stable in
- temperature range.
 - producer consumer distribution.
 - sunlight absorbed.
 - number of species.
21. Evaporation from water surfaces exposed to air is not dependent of the
- velocity of the wind.
 - humidity.
 - temperature.
 - depth of the water.
22. The phenomenon of occurrence of additional species in the ecotone or transitional zone between adjoining ecosystems is known as:
- Edge effect
 - Root effect
 - Coolidge effect
 - None of the above

23. What is a set of organisms that resemble one another in appearance and behavior called?
- Exons
 - Prions
 - Species
 - All of the above
24. Which of the following are major environmental issues associated with mining?
- Air pollution
 - Water pollution
 - Soil degradation
 - All of the above
25. In Bhutan, World Environment Day is celebrated every year on _____
- 22nd May.
 - 4th June.
 - 5th June.
 - 16th September.
26. An example of one-way ecological cycle is:
- Carbon dioxide cycle
 - Water cycle
 - Energy cycle
 - All of the above
27. Bhutan designated its first protected area in
- 1961
 - 1964
 - 1966
 - 1974
28. The National Biodiversity Strategies and Action Plan was published in
- 2012
 - 2013
 - 2014
 - 2020
29. The main purpose of the Environmental Risk Assessment is to
- ensure maximum local employment on the project.
 - eliminate any disruption to the environment during repair.
 - minimize the number of people likely to object to the project.
 - balance any environmental damage against the benefit of the repair.
30. What is Nagoya Protocol?
- It deals with access to genetic resources and the fair and equitable sharing of benefits arising from their utilization.
 - It is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms resulting from modern biotechnology that may have adverse effect on biological diversity, taking into account risks to human health.
 - It is an agreement among countries to take steps for reducing Ozone Depleting Substance.
 - None of the above.

PART II – Short Answer Questions [20 marks]

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks.

1. What is Herbarium? **(5 Marks)**
2. What is a circular economy? **(5 Marks)**
3. What are Multilateral Environment Agreements? **(5 Marks)**
4. What are Environmental Standards and why are they important in the context of Environmental Impact Assessment? **(5 Marks)**

SECTION B: Case Study [50 marks]

Choose either CASE I OR CASE II from this section. Each case study carries 50 marks. Mark for each sub-question is indicated in the brackets.

CASE I

Formal conservation in Bhutan started from 1960s with designation of first Manas Wildlife Sanctuary in 1966. Currently, Bhutan has about 70 percent of the total land under forest cover and 51.44 percent of the total land area under protected areas and biological corridors. Bhutan is part of the Eastern Himalayan region which contains parts of three global hotspots, 60 ecoregions, 330 important bird areas, 53 important plant areas, and a large number of wetlands. Bhutan's current status of biodiversity is a result of far-sighted vision and leadership of our Kings. As a consequence, Bhutan is blessed to still enjoy the biological diversity but pressures from development activities is increasing. With this brief background, please answer the following:

1. What is Biological Diversity? **(5 Marks)**
2. Discuss some utilitarian and some intrinsic values of biological diversity. **(5 Marks)**
3. List direct threats to biodiversity in Bhutan and explain each one of them? **(20 Marks)**
4. List indirect threats to biodiversity in Bhutan and explain each one of them? **(10 Marks)**
5. Discuss some of the importance of biodiversity. **(10 Marks)**

CASE II

Bhutan's freshwater system is mostly sourced from monsoon contributing about 72 percent of the feed and the rest are supplemented by glaciers and snow melts, wetlands and springs. Overall, we are blessed with combined outflow from the basins estimated at 70,576 MCM per annum or 2,238 cubic metre per second. This corresponds to 94,500 cubic metre per capita per year water availability as one of the highest in the world.

Water is the most essential basic necessity required for sustaining livelihoods, socio-economic development and maintaining ecosystem services. Water is at the heart of sustainable development, linking to almost all the Sustainable Development Goals and thus playing a pivotal role in delivering the said targets. Fresh water is becoming progressively scarcer if not scarce. With this brief background on water, answer the following:

1. Mention and discuss different uses of water in Bhutan. **(5 Marks)**
2. Briefly explain global trends in water. **(5 marks)**
3. What is Integrated Water Resource Management Plan? **(5 Marks)**
4. In Bhutan Hydropower is built on the river. List and explain adverse impacts of Hydropower construction in Bhutan. **(25 Marks)**
5. Discuss some benefits of hydropower plants. **(10 Marks)**

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