

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2024
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALISATION PAPER FOR ENVIRONMENTAL SCIENCE

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| Date | : October 5, 2024 |
| Total Marks | : 100 |
| Writing Time | : 150 minutes (2.5 hours) |
| Reading Time | : 15 minutes (prior to writing time) |

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & SECTION B:
 - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions
Part II - 4 Short Answer Questions

All questions under SECTION A are **COMPULSORY**.

 - **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions of your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. **All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the Section, Part and Question Number will NOT be evaluated and no marks will be awarded.**
6. Begin each Section and Part in a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. **You must hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **8 printed pages**, including this instruction page.

GOOD LUCK

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 is the Global Warming Potential of carbon dioxide?
 - a. 675
 - b. 1
 - c. 25
 - d. 298

2. A process whereby water bodies receive excess nutrients, especially N and P, which stimulate excessive growth of plants and algae, and eventually lead to degraded aquatic ecosystem, is termed as:
 - a. Biomagnification.
 - b. Acidification.
 - c. Eutrophication.
 - d. Salination.

3. The pH of the Standard Buffer Solutions to calibrate the pH Meter.....
 - a. 3.0, 6.0, 10.0
 - b. 4.0, 7.0, 10.0
 - c. 3.0, 7.0, 10.0
 - d. 4.0, 6.0, 10.0

4. The Secretariat to the National Environment Commission is:
 - a. Department of Water.
 - b. Department of Environment and Climate Change.
 - c. National Environment Commission Secretariat.
 - d. Department of Forest and Parks Services.

5. The effect of which air pollutant is described as “Lung Sunburns”?
 - a. Sulphur dioxide.
 - b. Nitrogen dioxide.
 - c. Carbon monoxide.
 - d. Ozone.

6. Proposed activity is subject to the Environmental Impact Assessment when:
- It has a moderate or unknown impact on the environment.
 - Initial environmental examination of the proposed activity shows potential significant adverse impacts on the environment.
 - Completed project adversely impacted the environment.
 - The nature of the proposed activity is not known.
7. Which of the following statements gives FALSE information about the 'Tragedy of Commons'?
- Everyone tries to reap personal benefits from a shared resource base.
 - Depletion of natural resources is an example of the Tragedy of Commons.
 - Everyone takes responsibility for conserving the shared resource base.
 - The shared resource base is gradually depleted.
8. A strategic approach for sustainable management of solid wastes encompassing all sources and all aspects, including generation at source, segregation, transfer, sorting, treatment, recovery, and disposal including the emphasis on maximizing resource efficiency is:
- Integrated solid waste management.
 - Solid waste management program.
 - Comprehensive waste management.
 - Maximum waste management.
9. The World Ozone Day is observed on:
- 22nd March.
 - 5th June.
 - 22nd April.
 - 16th September.
10. Crusty lichens can grow in:
- Polluted air.
 - Clean water.
 - Clean air.
 - Contaminated water.
11. A type of relationship where one of the organisms suffers and the other interacting species experiences no effect is called.....
- Commensalism.
 - Parasitism.
 - Neutralism.
 - Amensalism.

12. Which of the following gives FALSE information on environmental DNA (eDNA)?
- Generate information on species, populations, and communities.
 - Genetic material obtained directly from environmental samples without any obvious signs of biological source material.
 - Provide a universal framework to assess changing wildlife populations and inform real-time management decisions.
 - Collection of environmental samples such as soil, water, snow or air for further laboratory extraction is not required.
13. Angiosperms differ from gymnosperms in having:
- Fruits.
 - Cotyledon.
 - Tracheids.
 - Broad leaves.
14. The International Day for Biodiversity is observed on.....
- 22nd May.
 - 25th May.
 - 28th May.
 - 5th June.
15. Which of the following is the correct order of 3R principle?
- Reuse, Reduce, Recycle.
 - Reduce, Reuse, Recycle.
 - Recycle, Reuse, Reduce.
 - None of the above.
16. Montreal Protocol is related to:
- Extinction of Species.
 - Loss of Genetic Resources.
 - Ozone layer.
 - Reduce Greenhouse Gas emissions.
17. An alluvial deposit is:
- Amount of toxic chemicals in the soil, air, and water.
 - An area of sand, clay, or other similar material along a river bed or shore of a lake as a result of moving water.
 - Geological deposits and soils that are derived by in-situ weathering or gravitational movement or accumulation.
 - None of the above

18. The practice of adding cultured microorganisms into the subsurface for biodegrading contaminant in the soil and groundwater is:
- Biopurification.
 - Bioaugmentation.
 - Biocontainment.
 - Biostimulation.
19. According to Waste Prevention and Management Regulation, 2012, the wastes in Bhutan are generally categorized as Industrial waste, E- waste, Medical waste, and:
- Plastic waste
 - Biodegradable waste
 - Hazardous waste
 - Municipal Waste
20. The smallest wildlife Sanctuary in Bhutan is.....
- Bumdeling Wildlife Sanctuary
 - Sakteng Wildlife Sanctuary
 - Jomotsahangkha Wildlife Sanctuary
 - Phibsoo Wildlife Sanctuary
21. A group of tigers is called:
- Streak
 - Pride
 - Herd
 - Clowder
22. The World Environment Day in Bhutan is observed on:
- 5th June
 - 2nd June
 - 4th June
 - None of the above
23. Lignite is.....
- Wet soil.
 - Charcoal.
 - Carbon-rich soil.
 - Coal.

24. Bhutan adopted the Carbon Market Rules in:
- 2023
 - 2021
 - 2024
 - 2022
25. Asbestos is:
- A gray, brittle, and highly poisonous metal.
 - Naturally occurring fibrous silicate minerals.
 - Shiny silver-white, odorless, and exceedingly bio-accumulative.
 - A highly volatile solvent.
26. Basel Convention is related to:
- Persistent Organic Pollutant.
 - Radiation and radionuclides.
 - Transboundary movement of hazardous wastes and their disposal.
 - Disaster Management.
27. Which of the following produces Mycotoxins?
- Algae.
 - Fungi.
 - Microbes.
 - Plants
28. Which of the following is NOT a greenhouse gas?
- Carbon dioxide.
 - Chlorofluorocarbon.
 - Ozone.
 - Nitrogen.
29. Number of Biodiversity hotspots in the world.....
- 33
 - 36
 - 34
 - 30
30. Which of the following is NOT the pollution control equipment of the Ferro Alloys Plant?
- Ducting tube
 - Furnace hood
 - Screen house
 - Densification blower

PART II

Short Answer Questions [20 marks]

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

Q1. What is the Bhutan Climate Fund? Explain its functions. (5 marks)

Q2. What is Sustainable Consumption and Production? (5 marks)

Q3. What is Bhutan Waste Bank? (5 marks)

Q.4 What is natural capital accounting? (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

Waste Prevention and Management Act of Bhutan, 2009 is the legal instrument to protect and sustain human health through the protection of the environment by reducing the generation of waste at source; promoting the segregation, reuse, and recycling of wastes; disposal of waste in an environmentally sound manner; and effective functioning and coordination among implementing agencies.

1. What are hazardous and non-hazardous wastes? Explain with two examples each. (10 marks)
2. Explain the principle of 3Rs and waste minimization hierarchy. (10 marks)
3. What is the polluter pays principle? (10 marks)
4. What is E-waste? Explain with examples. (10 marks)
5. What is incineration? (10 marks)

CASE II

Bhutan will experience a drastic increase in heat and rainfall over the coming decades, which will result in an increased number of flash floods, affecting agriculture, hydropower, and forestry- the most climate-sensitive sectors. This is according to the 'Climate Change Projection' report launched recently by the National Centre for Hydrology and Meteorology (NCHM). As per the NCHM data, Bhutan receives an average annual rainfall of 1,800 millimeters (mm), with maximum temperatures averaging around 23 degree Celsius and a minimum of about 12 degree Celsius.

1. Why is Bhutan more vulnerable to extreme weather events such as floods, landslides, seasonal droughts, etc.?
2. What are GLOFs? (10 marks)
3. What are adaptation and resilience to climate change? Explain with examples. (10 marks)
4. State some examples of recent incidences of extreme events in the country. What were the likely causes of these events? (10 marks)
5. What strategic interventions should the government undertake to prevent and reduce the adverse impacts of extreme events on the local communities? (10 marks)

TASHI DELEK