

**ROYAL CIVIL SERVICE COMMISSION  
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2020  
EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALISATION PAPER FOR ENVIRONMENTAL SCIENCE**

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<b>Date</b>	: February 27, 2021
<b>Total Marks</b>	: 100
<b>Writing Time</b>	: 150 minutes (2.5 hours)
<b>Reading Time</b>	: 15 minutes (prior to writing time)

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**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 the 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 on 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 **7 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. What is the name of the action plan for sustainable development in the twenty first century framed in the Rio Declaration on Environment and Development (1992)?
  - a) Action 21
  - b) Agenda 21
  - c) Rio 21
  - d) Declaration 21
2. Under the list of globally threatened mammal species found in Bhutan, which of the following is listed as critically threatened?
  - a) Red Panda (*Ailurus fulgens*)
  - b) Snow leopard (*Uncia uncia*)
  - c) Pygmy hog (*Sus salvanius*)
  - d) Takin (*Budorcas taxicolor*)
3. Bhutan is not a Party to which of the following International Treaty/Agreement?
  - a) Convention on the Conservation of Migratory Species of Wild Animals.
  - b) Montreal Protocol on Substances that Deplete Ozone Layer.
  - c) United Nations Convention to Combat Desertification.
  - d) United Nations Convention on the Law of Seas.
4. Under the list of globally threatened bird species found in Bhutan, which of the following is critically threatened?
  - a) Rufous-necked Hornbill (*Aceros nipalensis*)
  - b) Black-necked Crane (*Grus nigricollis*)
  - c) Eastern Imperial Eagle (*Aquila heliaca*)
  - d) Red-headed Vulture (*Sarcogyps calvus*)
5. Bhutan has 51.44% of total Protected Area systems. Which one of the following has the biggest total area?
  - a) Royal Manas National Park
  - b) Jigme Dorji National Park
  - c) Wangchuck Centennial National Park
  - d) Jigme Singye Wangchuck National Park
6. In Bhutan, the Environmental Impact Assessment was formally institutionalized in
  - a) 1990
  - b) 1992
  - c) 1998
  - d) 2000

7. Bhutan Trust Fund for Environmental Conservation was established in
  - a) 1992
  - b) 1994
  - c) 1996
  - d) 1998
  
8. The phenomenon of accumulation of non-biodegradable pesticides in human beings is
  - a) Biomagnification
  - b) Bioaccumulation
  - c) Biodegradation
  - d) Bioremediation
  
9. Red data book contains data of
  - a) all plant species.
  - b) all animal species.
  - c) economically important species.
  - d) threatened species.
  
10. Of the following, the most impactful action you can take to reduce your carbon footprint is to
  - a) turn off your lights more often.
  - b) drive an electric car.
  - c) eat a plant-based diet.
  - d) hang your clothes to dry.
  
11. During rainy season, wooden doors are difficult to open and close because of
  - a) Imbibition
  - b) Plasmolysis
  - c) Diffusion
  - d) Osmosis
  
12. Sex of a newborn baby is determined by the chromosome inherited from the
  - a) Father
  - b) Mother
  - c) Father's father
  - d) Both (a) and (b)
  
13. The hardest part of the human body is
  - a) Tooth enamel
  - b) Femur
  - c) Temporal bone of skull
  - d) Knee bone
  
14. Forest fire can be classified into
  - a) Ground fire
  - b) Crown fire
  - c) Surface fire
  - d) All of the Above

15. Water pollution can be identified by testing its
- PH level
  - Biological Oxygen Demand
  - Both (a) and (b)
  - None of the above
16. The Ramsar Convention is an International Treaty for the conservation and sustainable use of Wetlands. It is also known as the Convention on Wetlands. What does Ramsar stand for?
- An environmentalist
  - A city
  - An endangered fish
  - None of the above
17. The headquarters of United Nations Environmental Program is at
- New York
  - Geneva
  - Stockholm
  - Nairobi
18. National Forest Policy of Bhutan was adopted in
- 1969
  - 1974
  - 1998
  - 2011
19. Basel Convention is related to the
- Transboundary Movement of Hazardous Wastes and their Disposal
  - Ozone Layer Depletion
  - Sustainable Development
  - Earth Summit
20. The Environmental Impact Assessment baseline data describes
- the environmental consequences of project.
  - existing environmental status of the proposed project.
  - assessment of risk on the basis of the proposal.
  - demographic and socio-economic data.
21. How do you remove leachate from a landfill?
- By gravity
  - By pumping from low points
  - Both (a) and (b)
  - None of the above

22. The main purpose of the Water Act of Bhutan 2011 is to
- ensure that every individual has access to safe, affordable and sufficient water for basic human needs.
  - ensure that National Integrated Water Resources Management Plan is formulated for coordinated development, management, conservation and efficient use of water resources.
  - ensure that the water resources remain as the property of the state.
  - ensure that the water resources are protected, conserved and/or managed in an economically efficient, socially equitable and environmentally sustainable manner.
23. How long does CO<sub>2</sub> remain in the atmosphere?
- CO<sub>2</sub> washes out of the atmosphere seasonally.
  - CO<sub>2</sub> remains in the atmosphere for 1 to 5 years.
  - CO<sub>2</sub> remains in the atmosphere for 5 to 10 years.
  - CO<sub>2</sub> remains in the atmosphere for up to 200 years or more.
24. Why are there winds?
- Because air flows down-hill.
  - Because of temperature differences.
  - Because air flows from high density to low density.
  - Because air flows along isobars.
25. How are warming ocean temperatures impacting whales, fish, and other marine mammals?
- They are not as hungry because of the rising temperature.
  - Makes them inactive to search for food.
  - Their migratory patterns are changing.
  - Fishes are schooling less.
26. Life cycle analysis is
- the area of biosphere required to sustain an individual, organization or country.
  - the amount of environmental degradation that the average person creates within their lifetime, expressed in monetary terms.
  - evaluation of the difference in the amount of environmental impacts caused by individuals from different parts of the world.
  - evaluation of all environmental impacts of a product from the time the raw materials are gathered to their ultimate disposal.
27. What happens if liquid oil contaminates a bird's plumage?
- Bird's bone becomes weak.
  - Bird's bone becomes heavy.
  - Bird's digestive system becomes weak.
  - Bird loses its water-repellent properties.
28. Which of the following vertebrates have the highest number of endangered species?
- Fishes
  - Birds
  - Reptiles
  - Mammals

29. Viable materials of endangered species are preserved by
- Mutation
  - Cloning
  - Gene bank
  - Gene pooling
30. Dissolved oxygen in streams is
- maximum at noon.
  - minimum at noon.
  - maximum at midnight.
  - same throughout the day.

**PART II – Short Answer Questions [20 marks]**

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

- In Bhutan groundwater is being abstracted without detailed scientific studies. Mention potential adverse environmental impact of groundwater abstraction.
- Explain adverse impact of climate change on Himalayan Ecology?
- Mention Bhutan's aquatic habitats found throughout the ecological zones?
- What is ecological niche?

**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**

It is a well-known fact that the current status of environmental conservation in Bhutan is a result of far-sighted vision and leadership of our Kings and our rich tradition of living in harmony with nature throughout the centuries. This has been further strengthened through the formal adoption of environment related policies. Environmental conservation could be said as a practice of saving the environment from the loss of species, and the destruction of the ecosystem, primarily due to pollution and human activities using various methods. The main purpose of conservation may be preserving the quality and purity of environment and establishing a balanced cycle of harvest and renewal so that a continuous supply of natural resources is ensured. With these in mind, answer the following questions:

- What is In-situ and Ex-situ conservation? (5 marks)
- What are the advantages and disadvantages of In-situ and Ex-situ Conservation? (20 marks)

3. Mention examples of In-situ and Ex-situ conservation practiced in Bhutan. (10 marks)
4. Explain the role of Biological Corridor in Bhutan. (5 marks)
5. Mention different types of zonation found in a national park in Bhutan and explain each one of them. (10 marks)

## **CASE II**

Humans have domesticated plants and animals for a long time using selective breeding or artificial selection. The process of selective breeding, in which organisms with desired traits, are used to breed the next generation. Numerous advancements in genetics have allowed humans to directly alter the Deoxyribonucleic Acid (DNA) and therefore genes of organisms. Humans have genetically engineered plants and animals for food, feed and processing. Nonetheless, there are different views on the Genetically Modified Organisms (GMOs). With these background, answer the following questions:

1. What is GMO? (5 marks)
2. Discuss what plants and animals have been genetically engineered so far? (5 marks)
3. Discuss Pros and Cons of GMOs? (20 marks)
4. Discuss potential negative impacts of GMOs on the environment. (10 marks)
5. Bhutan being one of the least developed countries in the world, should we promote GMOs or not. Substantiate your opinion. (10 marks)

**TASHI DELEK**