

**BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2011**  
**EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALIZATION PAPER FOR: ENVIRONMENT SCIENCE**

**Date** : October 30, 2011  
**Total Marks** : 100  
**Examination Time** : 2.5 Hours  
**Reading Time** : 15 Minutes

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**INSTRUCTIONS**

1. Write your Roll Number clearly on the answer booklet in the space provided.
2. The first 15 minutes is being provided to check the number of pages, printing errors, clarify doubts and to read the instructions. You are **NOT PERMITTED TO WRITE** during this time.
3. Use either **Blue** or **Black** ink pen or ball point pen for the written part and **Pencils** for the sketches and drawings.
4. All answers should be written on the Answer Booklet provided. Candidates are not allowed to write anything on the question paper.
5. This Question Booklet consists of **8 pages**. It is divided into two sections – namely SECTION A and SECTION B.
6. **SECTION A** consists of two parts. **Part I and Part II.**

**Part I** consists of 30 multiple choice questions carrying one (1) mark each and is **compulsory**. The answer of your choice should be clearly written **in whole** along with the question and option number on your answer booklet.

**Part II** consists of four (4) short answer questions of five (5) marks each and all questions are compulsory.

7. **SECTION B** consists of two **Case Studies**. Choose only **ONE** case study and answer the questions under your choice. Each case study carries fifty (50) marks in total.

## SECTION A (50 MARKS)

**Part 1: Select the correct answer from the multiple choices given below and write the answer against each question numbers on the answer sheet. Multiple answer questions (30 X 1 = 30 Marks)**

- 1. The National Environment Protection Act of Bhutan was enacted in the year**
  - a. 2010
  - b. 2009
  - c. 2008
  - d. 2007
  - e. 2006
  
- 2. In order to maintain the overall environment, some of the environmental management tools applied are**
  - a. Regulating the emission standards
  - b. Monitoring of pollution levels
  - c. Developing emission inventories
  - d. All of the above
  - e. None of the above
  
- 3. What are the primary air pollutants in the air?**
  - a. Sulfur dioxide
  - b. Carbon dioxide
  - c. Nitrogen dioxide
  - d. Photochemical smog
  - e. a & b
  
- 4. The National Environment Commission Secretariat has developed noise standards for mixed area which includes both day and night. These are**
  - a. Day - 55dB(A) and Night - 45 dB(A)
  - b. Day - 65dB(A) and Night - 55dB(A)
  - c. Day - 75dB(A) and Night - 65dB(A)
  - d. Day - 85dB(A) and Night - 75 dB(A)
  - e. Day - 90dB(A) and Night - 80 dB(A)
  
- 5. What are the natural sources of air emission causing air pollution?**
  - a. Volcanoes
  - b. Fossil fuel combustion
  - c. Decomposing organism
  - d. a and c
  - e. All of the above
  
- 6. In the environment sector, the acronym IEE for environmental assessment stands for**
  - a. Initial Environmental Examination
  - b. Initial Environmental Exit

- c. Initial Environmental Exchange
- d. Initial Environmental Exemption
- e. None of the above

**7. The environmental goods and services have no market which as a result the market fails. The characteristics of environmental goods and service leading to failure in the market is due to**

- a. Public goods
- b. Externalities
- c. a & b
- d. Monopoly
- e. None of the above

**8. Bhutan's approach to development is governed by Gross National Happiness (GNH) philosophy consisting of four main pillars. Which of the following is not the four pillars of GNH's?**

- a. Good governance
- b. Environment conservation
- c. Preservation of culture and tradition
- d. Economic development
- e. Balancing trade

**9. Name the types of valuation techniques applied for valuing the environmental goods and services**

- a. Contingent Valuation
- b. Travel Cost Analysis
- c. Changes in Productivity
- d. Cost Effective Analysis
- e. All of the above

**10. Water is made up of**

- a. Two atoms of Oxygen and One atom of Hydrogen
- b. Two molecules of Hydrogen and One molecule of Oxygen
- c. One atom each of Hydrogen and Oxygen
- d. Two atoms of Hydrogen and One atom of Oxygen
- e. Two molecules of Oxygen and One molecule of Hydrogen

**11. Different options or solutions to prevents market failures for environmental resources are**

- a. Establishing property rights
- b. Taxes or subsidies
- c. Non-market valuation of natural resources
- d. Legislative approach
- e. All of the above

**12. Types of ozone depleting substances are**

- a. Chlorofluorocarbons
- b. Hydrochlorofluorocarbons
- c. Halons
- d. Carbon tetrachloride
- e. All of the above

**13. The different types of natural cycles in the environment includes**

- a. The Hydrological Cycle
- b. The Oxygen Cycle
- c. The Nitrogen cycle
- d. The Phosphate Cycle
- e. All of the above

**14. The earth's atmosphere is broadly divided into**

- a. One region
- b. Two regions
- c. Three regions
- d. Four regions
- e. Five regions

**15. What is the function of Ozone (O<sub>3</sub>) in the stratospheric region of the earth's atmosphere?**

- a. To supply oxygen
- b. To protect life on earth from the sun's ultraviolet rays
- c. To decrease the temperature
- d. All of the above
- e. None of the above

**16. Eutrophication is caused by**

- a. Excessive nutrients in the water bodies
- b. Excessive sediments in the water bodies
- c. Excessive sunlight in the water bodies
- d. All of the above
- e. None of the above

**17. The different properties of water are characterized by**

- a. High surface tension
- b. Sticky
- c. Excellent solvent
- d. High melting and boiling point
- e. All of the above

**18. In determining the water quality, there are different indicators being applied. Of all these, the physical parameters for water quality indicators includes**

- a. pH
- b. Turbidity
- c. Colour
- d. b and c
- e. None of the above

**19. In the environment sector, what does the acronym triple RRR stands for?**

- a. Reduce, Reuse & Recycle
- b. Reduce, Reclaim & Refrain
- c. Reduce, Reassess & Revoke
- d. Redo, Return & Refine
- e. None of the above

**20. Minamata Incident in Japan was caused by**

- a. Mercury
- b. Cadmium
- c. Lead
- d. Arsenic
- e. Chromium

**21. The cause for the global warming is due to**

- a. Increase in earth's temperature
- b. Increase in the concentration of greenhouse gases
- c. Decrease in the concentration of greenhouse gases
- d. Decrease in earth's temperature
- e. None of the above

**22. The possible effects of climate change includes**

- a. Melting of the glaciers
- b. Flash flood
- c. Upward migration of plant and animal species
- d. Decline of winter
- e. All of the above

**23. During the Rio submit in 1992, the blueprint for the sustainable development principles includes**

- a. Precautionary principle
- b. Polluter Pays principle
- c. Inter-generational and intra-generational equity
- d. Public participation
- e. All of the above

**24. Bhutan is Party many international treaties. Of all, Bhutan's Party to the following multilateral environment agreement includes**

- a. United Nations Framework Convention on Climate Change
- b. Vienna Convention for the Protection of the Ozone Layer
- c. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
- d. a & b
- e. a, b, & c

**25. There are different types of waste water treatment. These options includes**

- a. Activated sludge process
- b. Trickling filter
- c. Waste stabilization pond
- d. a, b & c
- e. a & b

**26. What is the fundamental difference between Aerobic and Anaerobic treatment of waste water?**

- a. One is in the presence of sunlight and another in absence of sunlight
- b. One is in the presence of oxygen and another in absence of oxygen
- c. One is in the presence of water and another in absence of water
- d. One is in the presence of bacteria and another in absence of bacteria
- e. One is in the presence of nutrient and another in absence of nutrient

**27. What are the major man-made precursors for acid rain?**

- a. Water and Carbon dioxide
- b. Sulphur dioxide and Nitrogen oxides
- c. Calcium carbonate and Carbon dioxide
- d. All of the above
- e. None of the above

**28. The chief original reactant which result in the formation of photochemical smog are**

- a. Nitric oxide and Volatile organic compound**
- b. Carbon monoxide and water vapour
- c. Water vapour and sunlight
- d. b & c
- e. None of the above

**29. Plume which is coming out of stack/chimney has different shapes. Depending upon the weather conditions, the shape of the plume could be of**

- a. Fanning, Coning & Looping
- b. Vertical, Horizontal & Flat
- c. Cylindrical, Conical & Straight
- d. All of the above
- e. None of the above

**30. The greenhouse gas which is included under the Kyoto Protocol includes**

- a. Carbon dioxide
- b. Methane
- c. Nitrous Oxide
- d. Hydrofluorocarbons
- e. All of the above

**Part II: Provide short answers to the following question (4 X 5 = 20 Marks)**

1. During Rio summit in 1992, Agenda 21 contains action for global sustainable development. Some of the environmental sustainable development principles adopted are (a) Polluter Pays Principle (b) Precautionary Principle (c) Right to Sue (d) Access to Environmental Information (e) Public Participation. Please explain and provide write up against each of them.
2. Public involvement in the Environmental Impact Assessment of a development projects is very crucial and important. In this respect, please explain the need behind public involvement in the development process. In addition list the factors affecting effectiveness of public involvement.
3. Generally there are no markets for environmental goods and services that our natural environment provides, as a result market fails. To prevent from such happening, the government can come-up and adopt various economic policy instruments by internalizing the environmental cost and benefits. In this respect, please list some of the economic policy instruments and discuss at-least two Non-Economic Policy instruments and Economic Policy instruments in internalizing the environmental cost and benefits.
4. Explain Strategic Environmental Assessment and Environmental Impact Assessment, and accordingly list the differences.

**SECTION B (50 MARKS)**

**Choose only 1 (one) question from the following 2 (two) questions (1 X 50 = 50 Marks)**

1. With your environmental economics background, please select preferably an undeveloped area (for example Phobjekha under Wangdiphodrang Dzongkhag). Based on the type of area selection, please answer the following:
  - a. List and classify the environmental resources as per the concept of **Total Economic Value** (Use Value and Non-Use Value).
  - b. Mention and describe some of the different types of environmental valuation techniques for valuing the environmental resources. Choose at-least two appropriate techniques in determining the Total Economic Value (TEV) and mentions some of the drawbacks of the techniques applied.

- c. Just express the Net Benefits of development versus conservation based on the TEV for the easier understanding of the decision makers (You do not have to estimate and calculate, just mention how Net Benefits of development and conservation can be determined).
2. Any development projects have impact on the natural environment. In order to assess the impact on the environment, the **Environmental Impact Assessment** (EIA) is one of the management tools which are commonly practiced. In this regard, choose any industrial manufacturing project and answer the following:
  - a. Mention and briefly explain the generic steps in sequential order while carrying out EIA of the project.
  - b. Apply the above steps in assessing both positive and negative impacts of the project (project type that you have chosen) and list them accordingly.
  - c. Based on the impacts identified develop an Environmental Management Plan.
  - d. Develop an environment impact statement to be submitted to the decision makers for decision.

**End of Examination**