

**ROYAL CIVIL SERVICE COMMISSION  
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2015  
EXAMINATION CATEGORY: TECHNICAL**

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

---

<b>Date</b>	: 11 October 2015
<b>Total Marks</b>	: 100
<b>Examination Time</b>	: 150 minutes (2.5 hours)
<b>Reading Time</b>	: 15 Minutes (prior to examination time)

---

**GENERAL INSTRUCTIONS:**

1. Write your Roll Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided 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 and 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 under your choice.
4. 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 any or correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.
5. Begin each Section and Part in a fresh page of the Answer Booklet.
6. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
7. Use of any other paper including paper for rough work is not permitted.
8. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
9. This paper has **08** printed pages in all, 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 the correct answer chosen in the Answer Booklet against the question number. E.g. 31 (c). 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. Population, ecosystem, individual, community.
  
2. Which of the following are important biotic factors that can affect the structure and organization of biological communities?
  - a. Precipitation, wind, temperature.
  - b. Predation, competition, disease.
  - c. A and B only.
  - d. A, B, and C.
  
3. Introduced species
  - a. often fail to colonize the new area.
  - b. may become common enough to become pests.
  - c. both A and B are correct
  - d. A, B, and C are correct.
  
4. The proximate causes of behavior are interactions with the environment, but behavior is ultimately shape by
  - a. evolution.
  - b. the nervous system.
  - c. sexuality.
  - d. pheromones.
  
5. \_\_\_\_\_ of stratosphere provides protection to our life.
  - a. Nitrogen
  - b. Hydrogen
  - c. Ozone
  - d. Argon

6. The life supporting gases such as  $O_2$ ,  $CO_2$  and  $N_2$  are chiefly concentrated in the \_\_\_\_\_.
- troposphere
  - exosphere
  - mesosphere
  - stratosphere
7. A biosphere reserve conserves and preserves \_\_\_\_\_.
- wild animals
  - wild land
  - natural vegetation
  - all of the above
8. Atomic energy is obtained by using ores of \_\_\_\_\_.
- copper
  - uranium
  - neither (a) nor (b)
  - both (a) and (b)
9. Sanctuaries are established to \_\_\_\_\_.
- rear animals for milk
  - entrap animals
  - protect animals
  - none of the above
10. Red Data Book provides a list of \_\_\_\_\_ .
- advanced plants
  - rare, endangered or endemic species
  - disease resistant animals
  - none of the above
11. Ordinary table salt is sodium chloride. What is baking soda?
- Potassium chloride.
  - Potassium carbonate.
  - Potassium hydroxide.
  - Sodium bicarbonate.
12. Movement of cell against concentration gradient is called
- osmosis.
  - active transport.

- c. diffusion.
  - d. passive transport.
13. Most fish do not sink in water because of the presence of
- I. swim bladder
  - II. air bladder
  - III. air sacs
  - IV. air in spongy bones
- a. I and II are correct.
  - b. II and III are correct.
  - c. III and IV are correct.
  - d. I, II, III and IV are correct.
14. Plants synthesis protein
- a. starch.
  - b. sugar.
  - c. amino acids.
  - d. fatty acids.
15. Plants absorb dissolved nitrates from soil and convert them into
- a. free nitrogen.
  - b. urea.
  - c. ammonia.
  - d. proteins.
16. Out of 900 reported species of living gymnosperms, conifers are represented by about 500 species, About 2,50,000 species of angiosperms (flowering plants) have also been reported in the world. The vast and dominant woodlands in Europe, Asia, North America and mountains such as Himalayas are wooded with
- a. all gymnosperms, except conifers.
  - b. only angiosperms.
  - c. only conifers.
  - d. angiosperms and all gymnosperms except conifers.
17. Nucleus, the genetic material containing rounded body in each cell, was first discovered in 1831 by
- a. Robert Hooke.
  - b. Robert Brown.
  - c. Rudolf Virchow.
  - d. Theodore Schwann.

18. Plants that grow in saline water are called
- halophytes.
  - hydrophytes.
  - mesophytes.
  - thallophytes.
19. O<sub>2</sub> released in the process of photosynthesis comes from
- CO<sub>2</sub>.
  - water.
  - sugar.
  - pyruvic acid.
20. Of the following taxonomic categories which is the most inclusive (i.e. is the highest in hierarchy)?
- Order.
  - Subspecies.
  - Class.
  - Genus.
21. Our major food, fibers, spices, fruits and beverage crops are
- flowering plants
  - gymnosperms plants
  - pteridophytes
  - bryophytes
22. Pulses are a good source of
- carbohydrates.
  - fats.
  - proteins.
  - vitamins.
23. One day you wake with a sore throat and a runny nose. Your doctor takes a swab from your throat, sends it to a lab, and telephones you the next day to say that antibiotic will not help you get better. Which of the following is the most likely reason for the doctor's statement?
- Having waited a day, it is too late to take an antibiotic.
  - You need an antiseptic, not an antibiotic.
  - You need to be vaccinated instead of taking an antibiotic.
  - You are infected by a virus.

24. Which is the Protocol that Bhutan acceded on 22<sup>nd</sup> September 2002 under the Convention on Biological Diversity?
- Montreal Protocol.
  - Kyoto Protocol.
  - Cartagena Protocol.
  - None of the above.
25. While sampling in a stream, lots of stone fly species were discovered. Is the water
- Highly polluted
  - Moderately polluted
  - Pristine
  - All of the above
26. Reasons that the population size of an exotic species often grows rapidly when the species is introduced in a new environment include which of the following?
- The exotic species is resistant to pesticides.
  - There is a large, underutilized food sources in the new environment.
  - The exotic species has few natural predators in the new environment.
- I only
  - II only
  - I and III only
  - II and III only
27. Which of the following is the best example of environmental remediation?
- A species of trout becomes extinct in a eutrophic lake.
  - The annual volume of sewage flowing into a stream is decreased by one half.
  - The height of a factory smokestack is increased.
  - PCB - consuming bacteria are sprayed on an area that has soil contaminated with PCB's.
28. CITES treaty has been helpful in protecting endangered animals and plants by
- listing all species that can be hunted, traded and used commercially.
  - listing those species and products whose international trade is controlled.
  - funding projects for breeding endangered plants and animals.
  - specifying prices for certain plants and animal products.
29. Environmental mitigation hierarchy is
- prevent, control and remedy.
  - avoid, minimize and mitigate.

- c. collect data, monitor and enforce.
- d. look for alternative, choose and prepare environmental management plan.

30. Strategic Environmental Assessment can be understood as

- a. a systematic process for evaluating the environmental consequences of a proposed policy, program or projects.
- b. a systematic process for evaluating the environmental consequences of policy, plan or projects.
- c. a systematic process for evaluating the environmental consequences of policy, plan or program.
- d. none of the above.

---

**PART – II : Short Answer Questions (20 marks)**

**Answer ALL the questions. Each question carries 5 marks. Mark for each sub-question is indicated in the brackets.**

- 1. What is an ecosystem? (3 marks) What are the functions of an Ecosystem? (2 marks)
- 2. What are biotic factors? (2.5 marks) What are abiotic factors? (2.5 marks)
- 3. What will happen if all bacteria and fungi are eliminated from the earth? (5 marks)
- 4. What are the harmful effects of ultraviolet radiations? (5 marks)

---

**SECTION B**  
**Case Study**

**Choose either Case 1 or Case 2 from this Section. Each Case carries 50 marks.**

**Case 1**

Currently, few hydropower projects are under construction in Bhutan. The construction and operation of hydropower projects in Bhutan has impacts on the receiving environment. In connection to the construction and operation of a hydropower plant, answer the following:

- a. List potential positive impacts. (5 marks)
- b. Identify potential negative impacts. (10 marks)

- c. What are some of the associated impacts of hydropower construction? (5 marks)
- d. Prepare an Environmental Management Plan. (25 marks)
- e. What is your view on development of hydropower in Bhutan? (5 marks)

**Case 2**

Bhutan's current status of conservation and biodiversity is a result of the far-sighted vision and leadership of our Kings and our rich tradition of living in harmony with nature throughout the centuries. However, the socio-economic development in the country has exerted pressures on natural environment. Socio-economic development is known to threaten biodiversity. With this background, answer the following:

1. List threats to biodiversity (10 marks)
2. Briefly explain each threat (30 marks)
3. What do you think should be done to ensure that the threats are minimized. (10 marks)