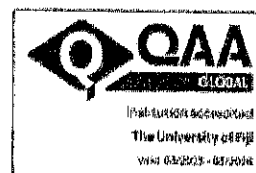




The University of Fiji
(An Entity of Arya Pratinidhi Sabha of Fiji)



SCHOOL OF SCIENCE & TECHNOLOGY

Semester 2, 2025

FINAL EXAMINATION PAPER

**ESC100: INTRODUCTION TO ENVIRONMENTAL
SCIENCES**

Important Instructions to Students:

1. There are 5 pages. Read the questions and instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes of reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours) to complete this paper**.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. This paper contains four (4) sections A, B, C and D. All questions are compulsory to answer **except** section D, where you have 2 choices.
6. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
7. This is a **Closed Book Examination**. The University views plagiarism, cheating and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

Section	Question	Content	Marks	Suggested Time
A	1-10	Multiple Choice	10	30 minutes
B	1-10	True and False	10	30 minutes
C	1-5	Short Answer Questions	40	60 minutes
D	1-3	Essays (Choose Any TWO out of Three)	40	60 minutes
		TOTAL	100	180 Minutes

*Registered with the Fiji Higher Education Commission as a University under the Higher Education Act 2008.
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Section A: Multiple Choice Questions (Each question is worth 1 mark = 10 Marks)

Write the numbers 1-10 in your answer book. Beside each one, write the letter of the BEST answer to each of the following questions:

1. Which factor is considered the primary determinant of a population's potential for exponential growth in a pristine environment?
 - A. The number of large predators in the area.
 - B. The age of the population's oldest members.
 - C. The ability of a species to find a mate and produce viable offspring.
 - D. The amount of non-renewable resources present.
2. The geological epoch defined by the rise of humanity and its overwhelming influence on planetary ecosystems is referred to in environmental science as the:
 - A. Holocene
 - B. Paleogene
 - C. Cretaceous
 - D. Anthropocene
3. The ecological consequence of isolating a larger habitat area into small, non-contiguous patches of natural vegetation is:
 - A. Increased gene flow between separated populations.
 - B. Decreased edge effects, leading to healthier core habitats.
 - C. Loss of core habitat area and decline of interior species.
 - D. The natural process of succession and self-repair.
4. Sustainable development, as emphasized by the Brundtland Commission, necessitates a simultaneous balance between which three pillars?
 - A. Political, Technological, and Economic factors.
 - B. Economic, Social, and Environmental factors.
 - C. Conservation, Preservation, and Restoration factors.
 - D. Supply, Demand, and Cost-Benefit Analysis factors.
5. The 'most favoured option' at the top of the Waste Minimization Hierarchy is:
 - A. Disposal
 - B. Recycling
 - C. Prevention
 - D. Energy recovery
6. In waste management, the biological treatment of organic solid waste (such as food scraps and yard trimmings) can result in the recovery of which useful product?
 - A. Steel and non-ferrous metals.
 - B. Pure elemental hydrogen.
 - C. Compost or biogas.
 - D. Concentrated sulfuric acid.

7. Which environmental ethic places human beings and their needs as the central focus of all ethical considerations regarding the natural world?
 - A. Ecocentrism.
 - B. Autotrophism
 - C. Anthropocentrism.
 - D. Mesomorphism
8. Which of the following is considered an abiotic factor that can constrain or reduce a population's size and growth rate?
 - A. Predation
 - B. Parasitism
 - C. Drought and extreme temperature changes.
 - D. Competition for mates
9. Which process is an example of a regulating ecosystem service provided by natural ecosystems?
 - A. Timber production.
 - B. Recreational tourism.
 - C. Climate regulation through the capture and storage of carbon.
 - D. Provision of freshwater aquifers.
10. Which is the fundamental initial step in the legislative process for creating a new Environmental Act within the Fijian judicial system?
 - A. Parliamentary reading and final approval.
 - B. Cabinet approval and signing.
 - C. Identifying the need and initiating policy development.
 - D. Immediate implementation and enforcement.

Section B: True or False Statements (Each question is worth 1 mark = 10 Marks)

Write numbers 1 to 10 on your answer sheet (booklet) and beside each number, write True or False. According to what you think each of the statements below is correct or incorrect.

1. Small Island Developing States (SIDS) are highly susceptible to the effects of rising sea levels primarily because of their low-lying coastal geography.
2. Ecological restoration efforts, such as wetland creation, often fail because they are done primarily for aesthetic reasons and do not restore full ecological functioning.
3. Ecosystem degradation in Pacific Island countries is overwhelmingly driven by anthropogenic factors (human activity) rather than natural processes.
4. The definition of preservation involves significant, active human intervention aimed at structurally reversing the decline of a degraded ecosystem.
5. Deforestation is a critical environmental issue in Fiji that is overwhelmingly driven by small-scale, non-commercial subsistence farming activities.

6. Traditional ecological knowledge (TEK) is increasingly viewed as an outdated approach that has no practical value for addressing contemporary climate change challenges in the Pacific.
7. Overfishing is scientifically proven to be the most significant factor causing the degradation of Fiji's coral reefs, exceeding the combined impact of all climate change-related factors.
8. Fiji's terrestrial ecosystems are considered to be poor in biodiversity and host very few endemic species of conservation significance.
9. The total landmass of Fiji is the smallest among all Pacific Island Countries.
10. Environmental Risk Assessments, particularly for major development projects, must integrate social, economic, and cultural considerations alongside physical environmental parameters.

Section C: Short Answer Questions (All questions are compulsory. Each question is worth 8 marks = 40 Marks)

1. Environmental Risks and Climate Change:

- Analyze the key characteristics of an Environmental Risk, referencing the core elements of the provided definition: *"the actual or potential threat of adverse effects on the environment by effluents, emissions, wastes, resource depletion or other similar activities arising out of or related to an organization's activities"*.
- Illustrate this analysis with a practical example of a specific environmental problem in Fiji (e.g., coastal erosion, heavy metal contamination) that is significantly intensified or exacerbated by the impacts of climate change.

2. Restoration Ecology:

- Explain the distinct aims and methodologies of 'Conservation' and 'Restoration'.
- Outline three specific ecological indicators a scientist would use to quantitatively measure the success of a degraded mangrove ecosystem restoration project.

3. Tragedy of the Commons (TOC):

- Define the "Tragedy of the Commons".
- Provide two distinct, detailed examples of how a shared, unregulated natural resource in the Fiji Islands (e.g., a coastal fishery, firewood from a community forest, or village river water) can be exploited for short-term personal gain, ultimately leading to its degradation.

4. Development and Environmental Planning:

- Assume you are the Director of the Department of Environment. A private sector company has submitted a proposal for a large-scale coastal reclamation and port development.
- Outline the preliminary steps and areas of environmental/social investigation you would prioritize to ensure the development adheres to the principles of sustainable development and the requirements of an Environmental Impact Assessment (EIA).

5. Habitat Fragmentation:

- Describe the ecological concept of 'Habitat Fragmentation'.
- Explain two negative consequences of this process on local biodiversity (e.g., species isolation and edge effects) and provide one practical example from the terrestrial environment of Fiji.

Section D: Longer Answer Essays (Choose Any TWO out of Three) (20 marks for each essay = 40 Marks)

Choose any TWO (2) of the following three (3) essay questions:

1. Social and Environmental Impact Assessment (SEIA):

- The Social and Environmental Impact Assessment (SEIA) is a critical tool for regulating development and promoting sustainable practices. Describe the principal phases and key steps involved in undertaking a comprehensive SEIA.
- Discuss two major limitations or challenges (e.g., quality, objectivity, technical capacity) that often undermine the integrity and effectiveness of the SEIA process in a developing nation's context.

2. Climate Change Impacts:

- Define 'Climate Change' as differentiated by the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC).
- Analyse the specific physical and socio-economic impacts of this phenomenon on vulnerable coastal and interior communities in the Fiji Islands (e.g., sea level rise, saltwater intrusion, extreme weather, and agricultural decline).

3. Qualitative Research in Environmental Science:

- Define 'Qualitative Research'.
- Explain its distinct role and importance in the field of Environmental Sciences, particularly for understanding complex issues like human-environment relationships, resource use governance, and the integration of Traditional Ecological Knowledge (TEK).
- Evaluate why incorporating qualitative methods is essential for achieving the social and sustainability goals of environmental management initiatives in a diverse Pacific Island context.

THE END

