

平成29年度

生命環境学群地球学類 推薦入試

小論文 試験問題

注意事項

- ① 問題Ⅰから問題Ⅲのすべてに解答すること。
- ② 解答用紙は各問題に対して1枚使用し、マス目用紙を用いること。それぞれの解答用紙の横長の箱内に「問題Ⅰ」のように問題番号を明記し、小問に分かれている場合は解答用紙に「問1」のように小問番号を記入した上で、小問ごとに解答すること。
- ③ 下書き用紙は試験終了後回収します。
- ④ 試験時間は120分です。

問題Ⅰ 次の英文を読み、下の問に答えなさい。

Thick red soils are common in the wet tropics and subtropics. They are the end product of extreme chemical weathering. Because tropical rain forests are associated with these soils, we might assume they are fertile and have great potential for agriculture. However, just ⁽¹⁾the opposite is true.

Because rain forest soils develop under conditions of high temperature and heavy rainfall, they are severely leached. Not only does leaching remove the soluble materials such as calcium carbonate but the great quantities of percolating water also remove much of the silica, with the result that insoluble oxides of iron and aluminum become concentrated in the soil. Iron oxides give the soil its distinctive red color. Because bacterial activity is very high in the tropics, rain forest soils contain practically no humus. Moreover, leaching destroys fertility because most plant nutrients are removed by the large volume of downward-percolating water. Therefore, even though the vegetation may be dense, the soil itself contains few available nutrients.

Most nutrients that support the rain forest are locked up in the trees themselves. As vegetation dies and decomposes, the roots of the rain forest trees quickly absorb the nutrients before they are leached from the soil. The nutrients are continuously recycled as trees die and decompose.

Therefore, when forests are cleared to provide land for farming or to harvest the timber, most of the nutrients are removed as well. What remains is a soil that contains little to nourish planted crops.

The clearing of rain forests not only removes plant nutrients but also accelerates erosion. ⁽²⁾When vegetation is present, its roots anchor the soil, and its leaves and branches provide a canopy that protects the ground by deflecting the full force of the frequent heavy rains.

⁽³⁾The removal of vegetation also exposes the ground to strong direct sunlight. When baked by the Sun, these tropical soils can harden to a bricklike consistency and become practically impenetrable to water and crop roots. In only a few years, soils in a freshly cleared area may no longer be cultivable.

(Edward J. Tarbuck and Frederick K. Lutgens 編, Earth, Person Education, Inc. より抜粋・改変)

注 fertile: 肥沃な、leach: 漉(こ)す、calcium carbonate: 炭酸カルシウム、percolate: しみ出る、silica: シリカ、humus: (土壌中の)有機物、nutrient: 栄養素、timber: 木材、nourish: (滋養物を与えて)養う、canopy: 覆うもの、deflect: (ボールなどの進路を)そらす、consistency: 硬度、impenetrable: 入り込めない

問1 下線部(1)の意味する red soil の性質を、文章中の記述に従って 200 字程度で説明しなさい。

問2 下線部(2)の文章を和訳しなさい。

問3 下線部(3) のようなことが起きると red soils はどのような状態になってしまうか、文章中の記述に従って 120 字程度で説明しなさい。

問題Ⅱ 近年、台風や集中豪雨による都市域の浸水が頻発し、都市機能を麻痺させる被害が増大している。都市域の浸水を増加させる要因と、浸水被害の軽減のためにとりうる対策について 300 字程度で述べなさい。

問題Ⅲ 日本列島のようなプレート沈み込み帯で起きている地質学的現象の一つについて、プレートの沈み込みにともなう作用と関連づけて、400 字程度で説明しなさい。