DISCOVERY
Program for
Global Learners
at OKAYAMA University

Personal Statement: Part B

Topics of Interest

(if you have selected "Science & Applied Science" as your first choice in "10. Desired Area(s) of Study" in online application form)

Applicant's full name: _____

Complete all sections in English. Respond to all questions. Part A and Part B should be written in an essay format.
Although you may consult teachers, counselors, and friends, all final writing must be your own words. If we detect
plagiarism, including material copied from websites, your application will not be considered any further. If you advance to the interview stage, you may be asked to answer questions or elaborate on your statement.
Use 12-point font single-space (Times New Roman preferred).

Explain any two of the following topics in one A4 sheet or within the specified frame:

- A 60-kg person stands on a scale inside an elevator. When the elevator starts to move upward, the reading on the scale increases uniformly from 60 kg to a maximum of 66 kg, then decreases uniformly to a minimum of 54 kg, and returns uniformly to 60 kg at the end. Draw the acceleration-time graph and indicate the maximum and minimum values of acceleration and the time that the speed reaches the maximum. Explain your results together with necessary equations and force diagrams.
- We live on the surface of the Earth surrounded by air. Devise a method to experimentally measure the density of the air near the Earth's surface and explain its principles involved.
- In the periodic table, elements are arranged in increasing atomic number into 7 horizontal rows called periods and 18 vertical columns called groups. Explain one of the physical properties that represent the repeating periodicity observed in the horizontal row of elements. Next, pick one of the 18 groups and describe the similarities shared by the group you chose.
- As an example of "symbiogenesis (endosymbiotic theory)", mitochondria are believed to become symbiotic after aerobic bacteria were incorporated into them. Please briefly explain the characteristics of mitochondria that could be the basis for this theory, along with those of aerobic bacteria.
- In self-pollinating plants such as peas, crossing two pure lines results in F1 individuals. These F1 individuals all share the same genetic composition. When the F1 individuals are self-pollinated, the resulting F2 population exhibits a wide variety of genotypes due to different combinations of genes. Peas are estimated to have more than 40,000 genes, and if the genetic differences between the parents are large, an enormous variety of genotypes can appear in the F2 population. Explain the reason why such genetic diversity arises in the F2 generation.

Note: Set and specify the detailed conditions necessary to explain the problem. Also, explain other phenomena that occur by the same principle.