京大過去問　２００６年　第２問

次の文の下線をほどこした部分(1)~(3)を和訳しなさい。

Between 1665 and 1666, with the plague in its prime, Newton escaped from his study in Cambridge to the isolated safety of his home in Lincolnshire. At the age of only twenty-two, and in addition to laying the scientific foundations of maths and astronomy, he began experimenting with prisms. Not one prism, as others had played with before, but two. And it was the second prism that revealed the true secret of sunlight, or ‘white’. It was already known that sunlight could be split into the colours of a rainbow by passing it through a prism. But earlier investigators believed that the prism itself altered the sunlight in some way as it passed through the glass, so the character of sunlight was changed. Newton arranged his sparse, dark room with a table in the middle. On the table he aligned, from right to left, a magnifying glass (a lens) and a prism. To the left of the table a white board was set up, reaching almost to the ceiling, with a series of small holes lining up vertically. To the left of this lay the second prism, mounted directly behind the lowest hole in the board. Nothing else lay between the second and the white wall of the room behind it. Newton waited.

The sun came round the corner of the house and eventually streamed in through the window at the right-hand side of the room. The sunlight was visible as a beam from Newton’s view, side-on to his apparatus, as it illuminated the dust in the air. (1)In order of events, the beam collided with the lens at a shallow angle and became redirected and focused towards the first prism. It then passed through the prism where it divided up into a spectrum, and struck the large board over a range of angles — red beams lit the board lower down, violet beams higher up, with a complete rainbow in between. Red light struck the board at precisely the position of the lowest hole, and so passed through it. On reaching the second prism, this red beam was further bent at precisely the same angle the first prism had bent it. But, against all understanding of the time, after transiting the second prism the red beam became… a red beam. Remarkable! The second prism had not altered the red beam. So prisms do not alter the nature of light! Newton rethought the mechanics of a prism. White light from the sun became a series of colours, but the colours could not be divided further. Sunlight, therefore, is actually a mixture of all the colours in the spectrum, Newton deducted. And of course, he was right. Simultaneously he had also promoted the spectrum to a new level of importance — it was a general property of white light and not an artefact of a prism. Now this continuum of merging colours, sprawling from violet to deep red, required some sort of classification.

(2)Different accounts exist of why Newton gave the rainbow, or white light spectrum, seven colours — violet, indigo, blue, green, yellow, orange and red. One account involves his interest in musical harmonies, where there are seven distinct notes in the scale. Newton, the story goes, proceeded to divide up the spectrum into spectral bands with ‘width’ (ranges of wavelengths for each colour) corresponding to the ratios of the small whole numbers in the scale. Another account involves the culture of the time, in which the number seven had magical or biblical significance. Either way, Newton’s seven colours are not the best choice. (3)If we are to divide up the spectrum into the colours we perceive, although strictly the colours do merge to form an infinite sequence, then today we prefer to omit indigo from Newton’s categorization. Indigo is not really seen as a separate colour. This leaves the modern spectrum with the order: violet, blue, green, yellow, orange, red. Six colours.