理学部　化学科［公募制推薦］　小論文

試験時間	90分

【注　意　事　項】
受験番号と氏名を全ての用紙に記入すること。
試験終了時に全ての用紙を回収します。

【問題】次の英文は2019年ノーベル化学賞 *"for the development of lithium-ion batteries"* について解説した Scientific Background の冒頭部分である。この英文を読んで、以下の問１～５に答えよ。

Electrical energy powers our lives, whenever and wherever we need it, and can now be accessed with evermore ease and efficiency — even in the absence of nearby power outlets. We increasingly move in unbound and wireless ways, and enjoy high mobility in a potentially healthier local environment. (ア) This dramatic development has been made possible by efficient energy storage devices, where high-capacity batteries enable, for example, a variety of electrically-driven tools and vehicles. In principle, we all can enjoy the use of mobile phones, cameras, laptops, power tools, etc., relying on efficient batteries to power them. As a consequence of modern battery technology, electric vehicles are also becoming increasingly popular, and we are in the middle of a switch away from vehicles powered by fossil fuels. In addition, efficient energy storage is an important complement to fluctuating energy sources, such as wind and sunlight. With batteries, the supply-demand chain can thus be balanced over time, even in situations when no energy can be produced.

To a large extent, these developments have been made possible by the lithium-ion battery. This type of battery has revolutionized the energy storage technology and enabled the mobile revolution. Through its high potential, and high energy density and capacity, this battery type has already contributed to improving our lives, and arguably will continue to do so in the years to come. However, battery development is very daunting and challenging in general, and perhaps particularly so when it comes to lithium-based cells. Many scientists and engineers, working in academia, industry, and even independently, have contributed to this development of batteries, realizing that the identification of solutions for efficient batteries is a highly difficult task. (イ) The development has thus been relatively sluggish and only very few efficient battery configurations have been successfully designed over the years. Nevertheless, due to several ground-breaking multidisciplinary scientific discoveries, encompassing electrochemistry, organic/inorganic chemistry, materials science, etc., these challenges could indeed be met, and the lithium-ion battery become a reality that essentially changed our world.

［出典］Scientific Background on the Nobel Prize in Chemistry 2019, LITHIUM-ION BATTERIES

注）　power outlet 電源コンセント／fossil 化石／complement 補足物／fluctuate 変動する／arguably ほぼ間違いなく／daunt ひるませる／academia 学界／sluggish 動きの遅い／multidisciplinary 多くの学問領域にわたる／encompass 含む

問１ This dramatic development が指している事柄を具体的に示しつつ、下線部（**ア**）を和訳せよ。

問２ 下線部（**イ**）を和訳せよ。

問３ 従来の電池と比較してリチウムイオン電池が画期的であると言える３つの要因を日本語で挙げよ。

問４ 英文中、battery と同じ意味で使われている英単語または熟語を２つ書き出せ。

問５ リチウムイオン電池の発明は、人類にこれまでどのような変化をもたらし、さらに今後その活用によってどのような変化が期待されると思いますか。３００字程度であなたの考えを日本語で述べなさい。