Why do you want to study this course or subject?

The ultimate basis of engineering is creating something for the purpose of enhancing life, whether that be through easing the difficulty involved in a task, reducing the time required, or minimising the necessary cost. An aspect of engineering which certainly achieves this, and excites me is 'bioglass 45S5'. I'm intrigued by a synthetic material's being so receptive to human tissue that bone can chemically bond with it. The possible applications for this are staggering, and benefit people on an individual level. I find the prospect of working on projects of this nature, with applications so profound, not only exciting but also fulfilling. Hence my applying for this degree. A favourite book at present is 'The Essential Engineer' by Henry Petroski. It raises the issue of confusing science with engineering, and argues that, whilst the former is elemental, more focus ought to be paid to the latter, should we want to solve global problems sooner. I agree to an extent, but think that the distinction is somewhat artificial, as they cross fertilise. The practical application of a scientific discovery can catalyse future scientific research. For example, following the use of x-rays for clinical purposes, the harmful effect of radiation exposure was observed, prompting further research into other, safer, methods of medical imaging, such as ultrasound and MRI scans. An ambition is to go onto research; to be at the forefront of innovation, where I would be not only researching as a scientist, but also applying this research as an engineer.

How have your qualifications and studies helped you to prepare for this course or subject?

I enjoy each of my A-Level subjects, but I have particularly liked the overlap between them. I am seeing Maths as the language in which Physics and Chemistry are expressed. I really enjoy getting to the root of a systematic problem, and solving it with the creative application of fundamental principles. In my chosen degree, I look forward to working in a field which has an interdisciplinary breadth, requiring an equal input from Chemistry, Maths and Physics.

What else have you done to prepare outside of education, and why are these experiences useful?

To gain an insight into engineering, I found courses run by the Smallpeice Trust. I was on the winning team in each of the three I attended. The first, when in year 8, was a simple design-build project for a remote control vehicle. As simple as it was, I see with hindsight that it encapsulated the essence of engineering: selecting materials and methods to achieve a desired end within a budget of time, cost and risk. The second course, in Structural Engineering, required a bridge to be built. I had a head start here, as I had made one when I was eight years old. This was a venture with my grandfather: we built a two metre Warren truss bridge from MDF offcuts, which I could walk across. Last summer's course at Plymouth University focussed on

naval engineering; a field new to me. Much of the technical side of it involved hull design-altering ballast and chining to result in desired trim and freeboard. However, upon reflection, I see clearly that the greatest limitation wasn't in design, but in materials- the balsa wood was buoyant and flexible, but absorbed water, while the EVA adhesive set quickly and bonded well, but was dense, leading to instability. The use of something like a styrene-acrylic polymer coating would not only have maintained the advantages of the balsa and EVA, but also provided water-repellency and decreased drag. My interest in engineering spreads beyond academia, and has a large role in my activities outside of school. I am, and have been for a while, an enthusiastic cider maker. What I enjoy most about it is not so much the product, as the process involved; refining steps and redesigning equipment to increase yield and ensure the purest cider. In doing so, I designed and constructed a press, from sleepers and coach bolts, which incorporated a car jack to extract the juice from over 100kg of apples. Testament to the engineering, it has gone on to press three seasons' worth, obtaining roughly 600ml juice for each kilo pressed.

Why do you want to study this course or subject?

Going to University to read a demanding subject, such as engineering, is particularly significant for me. It is a challenge that excites me and one that I intend to approach with enthusiasm and a robust work ethic. I am a problem solver. I developed this skill at a young age through my hobby as a computer programmer. More often than not engineering concerns solving problems in order to design, construct and operate mechanical systems. I feel that I possess this vital skill that will enable me to tackle my studies with zeal. I developed my interest in engineering by watching a YouTube channel by engineer Colin Furze. His videos consist of projects where he constructs contraptions, such as, a giant swing whilst relaying the building process. These videos provide insight into the engineering mentality, how to collect resources for a project and the art of effective communication. Colin's thermite gun was, by far, my favourite project! Furthermore, for some time, I have played an engineering version of Minecraft called Voltz. This game involves different teams of players building bases and engineering advanced technology such as ICBMs, force fields, teleporters and space travel. Here I experienced the satisfaction that comes with completing a project.

How have your qualifications and studies helped you to prepare for this course or subject?

More recently I experienced engineering disciplines in a university setting. At Southampton University, I attended 'Isaac Physics' events where teaching involved advanced Maths-like vectors, differentiation and circular motion in order to find the motion of planets around a solar system. I gained a real appreciation for the importance of maths and physics in an undergraduate setting and beyond. In addition, I was accepted onto the University of Cambridge 'HE+ programme'. Here I learned about Mandelbrot sets, group theory, dimensional analysis and how many cups of tea an atom bomb's energy could make! Not only this, in April 2017, I attended a University of Cambridge Maths Masterclass. I attended lectures in applicable and theoretical maths, including cryptography, proof by induction and axioms of maths. This experience taught me that, at University, I will prefer my studies to include the application of theoretical maths to real life situations.

What else have you done to prepare outside of education, and why are these experiences useful?

I consider that I will make a valuable contribution to University life. At college I have participated actively in extra curricular activities. As a member of the debating team I represented my former college in a competition involving local colleges successfully winning the debate 'Should the government privatize the NHS?'. The ability to analysis a problem is essential in many aspects of daily life and I relish the challenge to refine this skill. Secondly I was a Care Ambassador for Hampshire Country Council which involved being the focal point and advocate for children in

care. I met regularly with a variety of people including senior managers in order to discuss concerns and pragmatic solutions. This role involved supporting other young people in order to help them remain in education. This role has inspired me to go to university. Finally I was an LGBT ambassador at my former school where I helped facilitate an environment where people could feel comfortable. This involved working closely with other students and senior management in order to implement procedures that addressed bullying. It was by far my proudest contribution to my school. I am part of the 6% of care leavers wishing to enter higher education. My journey through education has been testing at times but, as a result of hard work, tenacity and determination, I am ready and eager to commence undergraduate engineering studies and shape my future.