American University of Beirut

Founders’ Day 2008 – Second Place Winning Student Essay

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By

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Dear President Dorman,

You may be expecting from participants a beautifully written essay comparing AUB's past to its present. But as a mechanical engineering student, I may not be able to do so. Instead, I will try to make up for the lack of beauty of my paper by scientific and methodic reasoning.

What first came to my mind was to do an incredible research (and as engineers we're pretty well trained to do that) to study the political, economical and social situation in Lebanon fifty years ago, then try to make an analytical comparison with today's conditions. But I got lost in the considerable amount of work I had to do and kept postponing my research. And thanks to this, I had found my answer to this essay.

As complicated as thermal fluids could be, everything we study in thermodynamics always sums up to the principle of conservation of energy. It is a law that states that the energy that goes in must equal the energy that goes out. The first step of every analysis is to specify the system of study. So I choose AUB to be the subject of my study. By AUB I mean AUB campus consisting of the buildings, the nature and the students. The second step is to write down the appropriate formula and define its terms:

$$\text{Win} - \text{Qout} = \text{PE} + \text{KE} + \text{U}$$

Win is the work input that allows the system to function. For AUB, it represents the work and effort the students put in for curricular and extracurricular activities. Qout is defined as the heat that goes out of the system as a result of the work input and the system's activities. So here, the heat that goes out from AUB as a result of the work input is the image that students give of AUB to the outside world. It is the interaction of students in the market, the great positions they obtain, the inventions they create... The difference Win - Qout represents the part of the effort of students that has not been invested on the outside of AUB (in their jobs, at home...).

KE is the kinetic energy. It is the energy representing the speed of the system. It is a representation of the enthusiasm of students on-campus and their dedication to their activities. PE is the energy due to the difference in elevation between two different heights. In AUB it is modeled by the difference in elevation by the higher and the lower campus. It is how closely students from different majors interact on AUB's campus. U is the Internal energy, also known as the microscopic energy. It represents all the internal reactions that take place inside the object. The formula of the change in internal energy is \(dU = mc\Delta T\) where: \(m\) is the mass (or in other terms the quantity) of students; \(c\) is the specific heat which is the energy that it takes to heat 1 kg of water by 1 degree Celsius. For AUB's analysis, it represents the knowledge acquired by the student. \(dT\) is the difference in temperature, thus the difference in opinion between students. By multiplying these three terms, the change in internal energy represents then the interactions between AUB students inside the campus. The Internal energy is created by difference of beliefs, of religions, of motivations, of majors... The sum PE+KE+U all
together represents the spatial, political and cultural interactions of students in AUB campus.

If AUB were an isolated system, meaning if it were completely cut out from its surroundings, Win - Qout would be equal to zero. But AUB is not an isolated system: it is in interaction with its environment and is sensible to the outside world. Students in AUB are sensible to the outside world. Win - Qout has not been equal to zero due to various factors: political instability, financial crises... Special circumstances have blocked AUB students from expressing themselves in the outer world, and the most recent example is the financial crises where it is almost impossible to find a job in finance. PE+KE+U has also never been equal to zero because interactions between students were never shut down. A lot of the work that students put into AUB, apart from studying, is to improve life on campus, it is the effort to coexist with people from very different backgrounds, it is the effort of organizing events and creating societies to join all students. And this has been possible because AUB has always been a site for academic freedom and ethnic reunion. Equating these two terms goes back to understanding this concept: what efforts students put in that does not go out from AUB stays in AUB. And these efforts are converted into political, spatial and cultural interactions on campus. KE+PE+U's positive term is the whole joy of being an AUB student!

And so my first advice to you, President Dorman, is to ensure that this first law of thermodynamics will always be conserved. Students in AUB must always have this fire that makes its campus so alive, that makes them sparkle on campus and off campus.

Exergy is a new term I have just learned in my thermodynamics class. It is the maximum obtainable work output from a system. The concept of exergy is really simple. It says that at a higher temperature, the same system can operate more efficiently. Exergy is maximal for reversible processes. And so you ask us what should be changed today: it is the exergy of AUB's students. Students today are faced with a higher temperature market. Competition has never been more aggressive, and chances are becoming slimmer. And so for AUB students to be able to obtain the hot spots, AUB's temperature should be raised to the market's. By temperature I mean activities, socio-political activities, trips, academic performance...

I wish you all the best in your presidency, I hope it will be a stay with expanded boundaries and free from all irreversibilities!