

**ENGINEERING TRIPOS Part IIA**  
**Extension Activity: Product Disassembly**  
**Open to students in all Engineering Areas –**  
**but particularly relevant to Module 3C1**



## **INTRODUCTION**

Product disassembly provides a good hands-on opportunity to learn about choice of material and process in product design and manufacture. In this ExA, students will work in pairs to take apart household products, seeking to answer a selection of the following questions:

- (a) what material is each component made of? [from its appearance and measuring density]
- (b) what are the mechanical and other design requirements for each component?
- (c) for strength-limited parts, what is the hardness and microstructure? [using hardness testing, microscopy]
- (d) how were the components shaped? [using appearance, microscopy, and knowledge of manufacturing processes]
- (e) what joining/assembly methods have been used? can these be categorised systematically, in relation to the materials involved and geometric characteristics, in a structure that could be applied across all products?
- (f) what surface treatments have been applied, and why?
- (g) how feasible is it to separate different materials for recycling at the end of life?
- (h) what is the embedded energy in the materials of the product, and how important is this in the life-cycle energy of the product?

## **ARRANGEMENTS**

**This is a new ExA, running in the Lent Term (dates TBC). Capacity will be limited, and may be balloted.**

*The first cohort are therefore guinea pigs* – to some extent your task will be to experiment and help us to refine the activity for future years. We will have products available to pull apart – but students may propose their own to the course leaders, and bring them along if suitable – ideally products should contain more than one material class and a sensible number of components, and possibly energy-using; also not too large/heavy – washing machine: just about OK; car: no!

To undertake this ExA, students should **sign-up online by 5pm on Friday of Michaelmas week 1** via the link in the table: <http://teaching.eng.cam.ac.uk/node/4133#hdr-2>). A ballot will be held (if required) and students notified of the result (so they may then complete their choice on COMET).

During the ExA period (around 2 weeks in Lent), students will:

- (1) attend an initial briefing.
- (2) work independently in pairs in the lab with technician support, and staff supervision to guide the choice of investigation and help with technical queries.
- (3) give 10 minute presentations in pairs to the rest of the group.
- (4) submit a one page visual summary poster on Moodle (this could be a piece of artwork – the figure at the top is from a previous IIB project, showing a disassembled portable power pack).

The total time spent should be around 20 hours, and satisfactory completion of all tasks will lead to a full mark of standard credit.