Examination Feedback for EEE124 – Energy in the Home
Spring Semester 2012-13

Feedback for EEE124 Session: 2012-2013

Feedback: Please write simple statements about how well students addressed the exam paper in general and each individual question in particular including common problems/mistakes and areas of concern in the boxes provided below. Increase row height if necessary.

General Comments:

This paper was presented as a computer-based assessment via MOLE. The test consisted of 60 questions. Most questions were multiple-choice, but some required short typed answers. Each student received the questions in a different, random order, so it is not possible to identify unique questions numbers. The exam was conducted under normal examination conditions in the St Georges computer suite (ME03/04). Most students coped well with the exam, though a small number failed to attempt many of the typed response questions. It is not clear if this was due to lack of time or another reason.

Questions:

Most of the questions were answered well, but there were a few that caused common errors. These are discussed below.

Circuit breaker
This question gave the diversity equation for a city flat and asked the student to decide on the correct circuit breaker. Substituting into the current diversity equation yields a maximum current of 16.43 A. Thus in this case the circuit breaker should be 20 A. 32 A would also be ok, provided the wiring is 4 mm cable and can safely allow 32 A. 16 A is clearly insufficient, as is 10 A and 6 A. Since 20 A and 32 A are typical for circuits consisting of sockets, the student can take an educated guess without the need for calculation.

LED lights
This question asked the student to describe how 400 nm LEDs could be used for office lighting. There are two points that need to be mentioned. Firstly, phosphors need to be added to the front of the LED to generate a mixture of red/green/blue (i.e. white) light. Nobody wants to work in an office lit by blue (400 nm) light ! Secondly, it should be noted that LEDs emit light in a narrow beam, hence reflectors/diffusers are necessary to light the entire room.

Water temperature at power station outflow
This question asked the student to calculate the water outflow temperature from a power station generating 1 MW at 40% efficiency. A common mistake was to assume that this implied that the water needed to absorb 1 MW, when in fact it needs to absorb the other 60 % of the power – i.e. 1.5 MW. This then yielded a temperature rise of 12.8 °C and thus an outflow temperature of 32.8 °C.

Combined heat and power (CHP)
Many students failed to appreciate the difficulty in transporting heat over large distances. The heat generated by CHP needs to used locally (e.g. for warming on-site greenhouses or for heating nearby buildings (e.g. Sheffield university!).