Exam Feedback: EEE103 2006/07

General Comments: I was pleased by your efforts with this paper. Once again the two main problems that some of you have are disorganisation and lack of explanation. A small number of you presented very messy work that was hard (in some cases impossible) to interpret and in a few cases you confused yourselves by failing to take an ordered approach to your questions. If you are doing an analysis, you need to draw a circuit diagram – how else can I credit correct formulation of equations describing the circuit? You need to explain briefly (three or four words is usually enough) what you are doing so that I can follow your thinking – if I just see a set of numbers or equations, you leave me in a position of having to guess whether or not you are intentionally doing the right thing.

Q1: Most people scored quite well on part (i) but about half of you had trouble with part (ii). Of that half, about half realised that the voltage would be halved by the series resistance of the faulty diode but failed to appreciate that the other diode was still good so the rectified half cycles alternated one normal then on of half amplitude. Part (iii) was an eye opener for me - there weren't many of you who knew how to work out the average value of the faulty diode waveform; shame on you! Most of you knew where to put *C* in part (iv) but some of you spoiled your answer by not stating assumptions. Part (v) was not very well answered - most people merely rewrote the question in a different way - eg in response to "explain why this type of rectifier and smoothing arrangement causes large transient currents ... " many of you wrote "This type of rectifier and smoothing arrangement causes large transient currents ... " which is hardly an explanation.

Q2 was a fairly standard R-C-diode question and most people successfully managed part (a) (i). A few of you seemed to think that reverse bias was something different from the diode terminal voltage. Part (a) (ii) was done well by only a very few. Many people ignored the V-I plot asked for in the question and drew a wave-shape (some triangular, some sinusoidal) instead and many of those who drew a V-I plot either drew it so badly that it was impossible to judge whether they knew what they were doing or drew a reasonable shape with no annotation. You must be careful with sketches - straight lines should look like straight lines and key points should be labelled. Parts (b) (i) and (ii) were generally done well.

Q3: Attempts at this question were very good. Part (a) was done well by most. In part (b) the majority of you were able to evaluate the dc conditions of the circuit although there was a significant minority who had clearly not practiced any dc condition activity in their lives! Most people could draw a small signal equivalent circuit and about two thirds of you knew what to do with it to estimate gain.

Q4: Most people had a good attempt at part (a). One or two thought virtual earths arose because of high input resistance of op-amps - for the record, input resistance has nothing to do with it! About 70% of you managed part (b) either completely or in part. Some of you developed the starting equations (for which you got credit) and then did some very strange things with them that led you away from where you needed to be. I got several perfect answers to the non-inverting form of the problem which, of course, was not relevant to the inverting circuit presented. In part (c), those of you who took an organised approach and wrote down what you were trying to do generally succeeded. Those who didn't tended to confuse themselves, get muddled up and lose sight of their objectives.