Examination Feedback for EEE140/EEE218 Introduction to Electric Circuits
Autumn Semester 2013-14

Feedback for EEE140/EEE218 Session: 2013-2014

General Comments:

The exam counts for 80% of the overall module marks, with 2 lab classes making up the remaining 20%. All candidates who attended the Workstation lab made a good effort and gained the full 8% of the module marks. Generally the lab reports for the AC circuit experiment were well attempted with most candidates achieving over 2/3 of the 12% module marks available. The main problems were poorly plotted graphs, with missing titles or unlabeled axes etc.

In general most candidates made a very good attempt at the exam and average marks were high. Feedback from previous years has been heeded and most candidates gave a good explanation of their answers, however some scripts were very untidy and difficult to read. There are still a number of candidate who fail to indicate the questions answered on the coversheet – this puts the examiner in a bad mood!

Question 1:

Attempted by about 79% of candidates. There were two possible methods of solving for the current in part (a)(i), and the majority of candidates opted for the more difficult method of finding the impedance first. Since the question only asks for the current (not the impedance) it is much easier to find the current in each branch and then sum these, taking into account the phase relationship between them. In part (a)(ii) many candidates missed calculating the power factor. Part (b), the series circuit, caused little problem. Parts (c)(i), (ii) and (iii) were fairly straight forward, the main problems being lack of explanation, particularly in deriving the expression for resonance in part (ii). In part (v) most candidates correctly calculated the value of inductance required for resonance, but many then did not realize that at resonance only the resistance affects the current, and ended up with complicated expressions for the impedance – or simply omitted finding the current altogether. The main problem in part (vi) was confusion between the Q factor (or magnification factor) with Q meaning VARs or Q meaning charge.

Question 2:

Attempted by about 83% of candidates. With hindsight this was rather an easy question and the majority of candidates scored well on part (a) and parts (b)(i), (ii) and (iii). Part (a)(i) caused very few problems although sometimes candidates rounded values too much. In part (b)(i) a few candidates used the current from part (a) whereas the addition of an additional (internal) resistor in series with the load will change this. In parts (b)(ii) and (iii) a handful of candidates incorrectly calculated the power by using the wrong voltage in $P=V^2/R$. By far the most problematic part of the question was (b)(iv) where an inductor was included. When supplied with DC there is no voltage across the inductor and it effectively shorts out R_2 and R_3 and the current is then only limited by the internal resistance. Many candidate noted that V_L was zero but then proceeded to calculate a value for the current through R_2 and R_3! Part (c) was similar to example on the tutorial sheets and the majority of candidates who attempted it gained the correct answer, but explanations were rather lacking.

Question 3:

Attempted by about 95% of candidates. With hindsight this was rather an easy question and the majority of candidates scored nearly full marks. Part (a)(i) caused very few problems, although several candidates omitted to calculate the power; in part (ii) many candidates calculated the power incorrectly using $P=I^2Z$ (incorrect) rather than $P=I^2R$, or again forgot to calculate it altogether. Section (iii) was well attempted, as was section (iv) although some candidates only calculated the number of turns for one winding, rather than both as requested. Part (b) was very high scoring and again any loss of marks tended to be with the power calculation – several candidates used the primary, rather than the secondary voltage.

Question 4:

Attempted by about 42% of candidates. In part (a)(i), despite the question asking for the network to be solved using Kirchoff's laws, the majority of candidates opted to use the superposition method; one mark was deducted for this provided the answer was correct. A common error was to correctly find the current through the 9Ω resistor, but then to multiply this by the Thevenin resistance (rather than by 9Ω) to obtain the Thevenin voltage. In part (a)(ii) marks were generally lost for failing to draw the Norton circuit correctly (current source with parallel resistor), or not drawing it at all. Most candidates made a good attempt at part (b), although some confused real power with kVA, which led to the incorrect current in part (b)(iii). In part (c)(i) some candidates simply added the kVA values together rather than resolving each load into its real and reactive power components to find the total real and reactive powers first – there is a highlighted warning in the course notes about this. The main problem in part (c)(iii) were errors caused by using 11 for the voltage (rather than 11000) or 798 (rather than 798000) for the VARs.