MA 315 Galois Theory / January-April 2014

(Int PhD. and Ph. D. Programmes)

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Lectures : Monday and Wednesday ; 11:30–13:00 **Venue:** MA LH-4 (**if LH-1 is not free**) / LH-1

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Midterms : Thu. Feb 27 (14:00-16:30); **Quizzes : (Wed-Lect)** Feb 05 ; Mar 12 ; **(Sat-Lect)** April 05

Final Examination : 9 AM-12 Noon, Thursday, April 24, 2014

Evaluation Weightage : Quizzes : 10% **Seminar :** 10% **Midterms :** 30% **Final Examination :** 50%

Range of Marks for Grades (Total 100 Marks)						
	Grade S	**Grade A**	**Grade B**	**Grade C**	**Grade D**	**Grade F**
Marks-Range	> 90	76–90	61–75	46–60	35–45	< 35

Quiz 1 (Wednesday, February 05, 2014)

NAME / SR No.: **Marks (Obtained / Total): / 10**

Q 1.1 Let $p_1,\ldots,p_r$, $r\geq 3$, be pairwise distinct prime numbers and let $x_1,\ldots,x_r\in\mathbb{R}$ with $x_i^2=p_i$, $i=1,\ldots,r$.

(a) Show that the field extension $\mathbb{Q}(x_1,\ldots,x_r)\,|\,\mathbb{Q}$ is a Galois extension and that for every $i=1,\ldots,r$, there exist $\sigma_i\in\operatorname{Gal}(\mathbb{Q}(x_1,\ldots,x_r)\,|\,\mathbb{Q})$ such that $\sigma_i(x_i)=-x_i$ and $\sigma_i(x_j)=x_j$ for every $j=1,\ldots,r,\ j\neq i$.

(b) Use part (a) above to prove that $x_1,\ldots,x_r$ are linearly independent over $\mathbb{Q}$.