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

TAs/Corrections by : Aritra Sen (john.galt.10551990@gmail.com) / **Palash Dey** (palash@csa.iisc.ernet.in)

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 2 (Wednesday, March 12, 2014)

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

Q 2.1 Let $m,\ n\geq 2$, be relative prime natural numbers.

(a) Let $L\,|\,K$ be a field extension and let $x\,,y\in L^{\times}$. Suppose that $x^m\in K$ and $y^n\in K$. Show that xy is a primitive element for the field extension $K(x,y)\,|\,K$. [3 Points]

(b) Let $\zeta_m\,,\ \zeta_n\in\mathbb{C}$ be the primitive m-th and n-th roots of unity respectively. Use part (a) above to prove that $\operatorname{Gal}(\mathbb{Q}(\zeta_m\,,\zeta_n)\,|\,\mathbb{Q}) \xrightarrow{\approx} \mathbb{Z}_m^{\times}\times\mathbb{Z}_n^{\times}$. [7 Points]