

STARTING QUESTIONS FOR MAT4580/MAT9580 SPRING 2023

Please be prepared to answer a randomly chosen one the following six questions at the beginning of your examination. Plan the level of detail so that you spend four to six minutes on your answer.

CHAPTER 4

(a) Express $H^*(BU(n))$ in terms of $H^*(BU(1)) = \mathbb{Z}[y]$. Outline a proof for this expression.

CHAPTER 5

(a) Define the complex K -theory of a finite CW complex X . Prove that it satisfies $KU(X) \cong [X, \mathbb{Z} \times BU]$.

CHAPTER 6

(a) Define the bordism ring, in either the (smooth) unoriented or the (almost) complex case. Explain how it is related to the homotopy ring of the corresponding Thom spectrum MO or MU .

CHAPTER 7

(a) What is an orthogonal spectrum? How is the smash product of two orthogonal spectra defined?

CHAPTER 10

(a) What is the height of a formal group law (over a commutative ring containing \mathbb{F}_p)? What are the possible heights that occur?

CHAPTER 11

(a) State Landweber's exact functor theorem. Outline the proof, using Landweber's filtration theorem and the classification of invariant prime ideals.