

University of KwaZulu-Natal, Durban Centre  
School of Environmental Sciences  
November 2011 Examinations  
Advanced Remote Sensing – ENV5720

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This paper consists of **ONE** page

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Time: 3 Hours  
Total marks: 200

Internal Examiner: Prof F. Ahmed  
External Examiner: Prof S. Grab

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**INSTRUCTION:** Answer **FOUR** questions **ONLY**

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1. Radiation (radiant energy) that is not absorbed or scattered in the atmosphere can reach and interact with the Earth's surface. Describe and discuss radiant energy interactions with objects on the Earth's surface. (50)
2. Explain the key concepts of 'resolution' as used in remote sensing. Discuss how the different resolution types affect the use of remotely-sensed data in a particular application. (50)
3. Pre-processing is a pre-requisite for digital image processing. Describe and discuss a typical image pre-processing sequence. (50)
4. Digital image enhancement and transformations are used to assist in the visual interpretation and analysis of images. Provide a detailed account of the techniques used in image enhancement and transformations. (50)
5. **Either**
  - (a): Provide a full explanation of the procedures employed in the supervised classification of remotely sensed images. Pay particular attention to the predefinition of clusters (classes) and the commonly used classifier algorithms (classifiers). (50)

**OR**

- (b): Provide a detailed account of the use of Neural Networks in satellite image classification. (50)
6. Explain how you would use accuracy assessment for evaluating the classification accuracy of a classified digital image. (50)
7. Describe what are vegetation indices (VIs) are? Explain the basic concepts used to determine VIs from remotely-sensed data. Discuss some of the most important applications of VIs. (50)
8. Explain how hyperspectral remote sensing provides image data in hundreds of bands. Discuss how hyperspectral systems work, outline some of their potential applications, and explain the problems encountered in processing hyperspectral data. (50)
9. Explain, in detail, how remote sensing techniques can be applied in an application area of your choice. (50)