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## Quiz 5 - Key

### 1. What is image classification?

An image classification is a method for categorizing pixels of a remotely sensed image into specific land cover types using either automated or semi-automated methods.

### 2. What are 3 common types of image classification? Briefly describe each.

- a. Unsupervised – a method of auto-generating spectral classes and an optional spectral signature file. Additional review and analysis will likely be required to identify the specific land cover classes
- b. Supervised – a method that uses a spectral signature file created by the image analyst to then auto categorize pixels into spectral classes. Additional review and recoding of spectral classes to information classes will likely be required
- c. Object-based – a method that uses image segmentation and a hierarchy set of rules to identify specific land cover types or areas

### 3. What is a classification scheme and why is it required for an image classification?

A classification scheme is a set of defined land cover or land use types that are used to guide the image classification process and will ultimately end up in the final land cover classification data set. The classification scheme will be used to generate spectral signatures and to recode spectral classes to information classes or land cover types.

### 4. What is a minimum mapping unit and why is it important for image classification?

A minimum mapping unit is the smallest contiguous area that is mapped in the image classification data set. This provides the level of detail that will result in the image output.

### 5. What is a spectral signature?

A spectral signature is a group of pixels that represent a single land cover type and also has associated statistics that define the spectral characteristics of the land cover type. These are the mean, standard deviations, and variance.

### 6. What are the two primary objectives of creating a set of spectral signatures for image classification?



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A set of spectral signatures represents unique signatures for each land cover type expected to be identified in the image classification. For every unique land cover type a number of spectral signatures will be identified that represent the spectral variability of the land cover type across the geographic area of the image classification project.

7. What is a method to evaluate the quality of a single spectral signature?

A number of methods can be used to evaluate a single spectral signature. Any of the following are valid.

- a. Spectral statistics – review the table of means, standard deviations, and variances for a specific signature
- b. Histogram – review the shape of graph distribution of the pixel counts that make up the spectral signature.
- c. Scatter Plot – review the pixel count comparison between different image bands

The first two methods are most commonly used.

8. What characteristics does a “high quality” spectral signature have in order to be useful in a supervised image classification?

A spectral signature that is high quality is one that:

- a. Represents a homogenous set of pixels (that is the pixels have similar brightness values for a given image band)
- b. Has small standard deviations and variances
- c. Has narrow and uni-modal histograms for each band. Uni-modal refers to a histogram with a single curve depicted.

9. Describe the method for evaluating an entire set of spectral signatures.

A common method to evaluate a full set of spectral signatures is a dendrogram routine. This routine can compare pairs and groups of spectral signatures for similarity between signatures. An analyst is able to also see if the signatures from different land cover types have different spectral characteristics or not.

10. What is the difference between a “spectral class” and an “information class?”

A spectral class represents a set of pixels that similar spectral characteristics such as similar brightness values compared to the spectral signatures mean.



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An information class represents one of the land cover types defined in the classification scheme and a single land cover class in the final image output.

11. Describe the process of converting spectral classes to information classes?

A reclass or recode routine is used to renumber the unique spectral class values (usually a number) to the information class types (also usually a number). The specific information class numbers refer to specific land cover types that are defined in the land cover classification scheme.



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