Here are 10 multiple-choice questions (with answers) related to using RStudio, QGIS, and ArcGIS for land use/land cover (LULC) classification:

**Multiple-choice questions**

1. In RStudio, which package pair is most commonly used to read and process multispectral rasters for LULC classification?

A. ggplot2 and dplyr

B. raster/terra and sf

C. shiny and plumber

D. lme4 and nlme

1. In RStudio, which function is typically used to apply a trained model to classify every pixel in a RasterStack/SpatRaster?

A. predict()

B. mutate()

C. aggregate()

D. filter()

1. In RStudio workflows, which algorithm is most frequently used as a strong baseline for supervised LULC classification due to robustness to noisy features?

A. K-means

B. Random Forest

C. Naive Bayes

D. PCA

1. In QGIS, which core tool is used for pixel-based supervised classification using training samples with a machine-learning backend?

A. Hillshade

B. Semi-Automatic Classification Plugin (SCP)

C. Vector Geometry

D. Topology Checker

1. In QGIS SCP, what is the main purpose of the “ROI” manager?

A. Creating slope classes

B. Managing training polygons and spectral signatures

C. Computing NDVI time series

D. Exporting web maps

1. In ArcGIS Pro, which tool provides a guided interface for collecting training samples and running supervised classification (e.g., Random Trees, SVM)?

A. Raster Calculator

B. Image Classification Wizard

C. Hydrology tools

D. Interpolate Shape

1. For accuracy assessment across all three platforms (RStudio, QGIS, ArcGIS), which metric set is most standard for evaluating classification results?

A. MAE and RMSE

B. Confusion matrix, overall accuracy, user’s/producer’s accuracy, and kappa

C. AUC-PR and F1 only

D. R-squared and adjusted R-squared

1. When preparing Sentinel-2 imagery for LULC classification, which preprocessing step is most critical before supervised learning in any platform?

A. Randomly shuffling pixel order

B. Radiometric/atmospheric correction and band alignment

C. Converting raster to CSV only

D. Reprojecting to geographic CRS regardless of input

1. In QGIS, which expression or tool is commonly used to create indices (e.g., NDVI) to improve separability of classes before classification?

A. Field Calculator on vector layers only

B. Raster Calculator with band math

C. Mesh calculator

D. 3D Map view

1. In ArcGIS Pro for object-based image analysis (OBIA), which workflow component is typically performed first?

A. Export Layout

B. Clip Raster to mask objects

C. Zonal Statistics

D. Segmentation (e.g., Mean Shift) to create an image