NPTEL Online Certification Courses

Indian Institute of Technology Kharagpur

MACHINE LEARNING FOR SOIL AND CROP MANAGEMENT

Assignment- Week 6

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total mark: 15 X 1 = 15**

QUESTION 1:

Name the instrument shown below:

a. PXRF
b. Nix Pro
c. Spectroradiometer
d. Spectrophotometer

Correct Answer: a

Detailed Solution: The instrument shown above is the PXRF.

QUESTION 2:

Which of the following proximal soil sensors measures reflected radiation?

a. DRS, Nix Pro
b. PXRF, Gamma spectrometry
c. Penetrometer
d. Ion selective electrode

Correct Answer: a

Detailed Solution: DRS, NixPro, and Camera are some of the proximal soil sensors that measure the reflected radiation and are used to measure soil

organic carbon, total organic carbon, total nitrogen, soil color, texture, and moisture.

QUESTION 3:

Which of the following parameters can be measured using PXRF?

a. Water heavy metals
b. Leaf elements
c. Soil heavy metals
d. All of the above

Correct Answer: d

Detailed Solution: PXRF can be used to measure soil pH, EC, CEC, P, K, Ca, Mg, S, Macronutrients, Gypsum, %BS, Heavy metals, permafrost pH, LULC, Parent Material, Profile horizonation, geochemistry, compost EC, Compost CEC, Water heavy metals, Leaf elements.

QUESTION 4:

If, correctly classified data for a site (A) =15; correctly classified reference data for the site (A) =10, total reference data for the site (A) = 30, total classified data for the site (A) =60

Then what would be the Producers Accuracy for the site (A)?

a. 33.33 %
b. 16.66 %
c. 50 %
d. 25 %

Correct Answer: a

Detailed Solution: Correctly classified reference data for the site (A) =10, total reference data for the site (A) = 30, so, Producers Accuracy for the site (A) would be = (10/33)*100 = 33.33

QUESTION 5:

What are the advantages of sensor fusion?

a. Increased accuracy and reliability by combining data from multiple sensors
b. Improved robustness to environmental challenges
c. Ability to overcome individual sensor limitations
d. All of the above

Correct Answer: d

Detailed Solution: Sensor fusion offers several advantages, including increased accuracy and reliability by combining data from multiple sensors, improved robustness to environmental challenges, enhanced perception capabilities, better decision-making, and the ability to overcome individual sensor limitations.

QUESTION 6:

PXRF stands for:

a. Predictive X-Ray Fluorescence
b. Precision X-Ray Fluorescence
c. Portable X-Ray Fluorescence
d. None of the above

Correct Answer: c

Detailed Solution: PXRF stands for Portable X-ray fluorescence.

QUESTION 7:

Which element in soils or powders cannot be detected by PXRF scanning?

a. Antimony
b. Lithium
c. Rubidium
d. Zirconium

Correct Answer: **b**

Detailed Solution: Lithium present in soils or powders cannot be detected by PXRF scanning.

QUESTION 8:

Which of the following is a color model?

a. RGB
b. CMYK
c. CIEL*a*b*
d. All of the above

Correct Answer: d

Detailed Solution: Different color models are: RGB, CMYK, CIEL*a*b*, and XYZ.

QUESTION 9:

Which of the following software was used to convert Nix color values to Munsell soil color codes during the first soil application of Nix sensor?

a. ColorProof
b. OpenColor
c. BabelColor
d. Color Server

Correct Answer: c

Detailed Solution: During the first soil application of Nix, sensor measurements were compared to the soil color chart by converting the Nix values to Munsell soil color codes using BabelColor conversion software.

QUESTION 10:

Pedocals is a soil class that contain large amounts of _____.

a. $CaCO_3$
b. Fe
c. Al
d. None of these

Correct Answer: a

Detailed Solution: Pedocals contains large amounts of $CaCO_3$.

QUESTION 11:

In the fine earth matrix, during the pedogenic carbonate development stages, carbonate plugs and cements in which horizon of a soil profile?

a. A horizon
b. B horizon
c. C horizon
d. O horizon

Correct Answer: b

Detailed Solution: In the fine earth matrix, during the pedogenic carbonate development stages, carbonate plugs and cements in the B horizon.

QUESTION 12:

Which of the following is/are an example of a proximal soil sensor?

a. Nix Pro
b. PXRF
c. DRS
d. All of the above

Correct Answer: d

Detailed Solution: DRS, PXRF, Nix Pro, Laser-induced breakdown spectroscopy, Penetrometer, etc are some of the examples of proximal soil sensors.

QUESTION 13:

_____ and _____ are two of the most important elements for agronomic production and soil health assessment.

a. Carbon, Sulphur
b. Nitrogen, Phosphorus
c. Nitrogen, Carbon
d. Carbon, Phosphorus

Correct Answer: c

Detailed Solution: Nitrogen and Carbon are two of the most important elements for agronomic production and soil health assessment.

QUESTION 14:

What is the use Munsell Soil Color Chart?

a. To determine soil texture
b. To measure soil pH levels
c. To classify and describe soil color accurately
d. To analyze soil nutrient content

Correct Answer: c

Detailed Solution: The Munsell Soil Color Chart is a standardized tool used in soil science to classify and describe soil color accurately. It categorizes color using three components: Hue, Value, and Chroma. Soil scientists use this chart to assess soil properties, including organic matter content, mineral composition, and drainage conditions. It helps in soil classification, land evaluation, and environmental studies.

QUESTION 15:

Proximal sensor like _____ can be used to measure the real-time plant Color Description.

a. Nix Pro

b. PXRF

c. Time Domain Reflectometry

d. Ion Selective Electrode

Correct Answer: a

Detailed Solution: Nix Pro as a proximal sensor can measure real-time soil and plant color description.