



The Open University of Sri Lanka
 Faculty of Engineering Technology
 Industrial Studies (Agriculture) & Technology (Agriculture
 Engineering) Programme of Study
 Final Examination 2015/2016
 AEX4240/AEX3232 – Plant & Soil Science

Date : 24/11/2016
 Time : 09.30 a.m. – 12.30 p.m.
 Duration : Three (03) hours

Registration Number:.....

Section II – Answer any four (04) out of the six (06)-questions. You may use answer books and/or sheets to answer this section.

- 1) Describe the major processes of rock weathering and soil development.
- 2) One hectare field requires the following nutrients for corn cultivation: N - 21.3 kg, P₂O₅ - 4.5 kg, K₂O - 24.7 kg, S - 33.6 kg. Urea, triple super phosphate, muriate of potash, and calcium sulphate (CaSO₄) contain 46%, 45%, 60%, and 17% of N, P₂O₅, K₂O, and S, respectively.
 - a) Calculate how much is needed from each fertilizer to fulfill the nutrient requirement of corn cultivation.
 - b) If the farmer decides to use ammonium sulphate {(NH₄)₂SO₄} instead of CaSO₄, calculate how much of (NH₄)₂SO₄, he should apply to fulfill the S requirement for the same cultivation. Hint: N% in (NH₄)₂SO₄ is 21%. S % in (NH₄)₂SO₄ is 24%.
 - c) Considering the fertilizer application mentioned in part b), justify whether the farmer needs to add urea into the field.
- 3) Explain all the processes that are responsible in making nitrogen available for plants.
- 4) "Biological organisms in soil play a key role in improving soil for better plant growth." Comment on this statement.
- 5)
 - a) What are the factors that contribute to have acidic soils?
 - b) Name three (03) common liming materials that are being used to reduce soil acidity.
 - c) The Carbon:Nitrogen (C:N) ratios of corn and soybean residues are 20:1 and 70:1, respectively. Out of the two (02), explain which type of residue is more suitable to be applied to a nitrogen-deficient field.
- 6)
 - a) What are humic substances and how are they formed?
 - b) Discuss how humic substances affect cation exchange capacity of soil.