

Q1.

Total: 10 marks

(a)	
The measure of the acidity of a soil	2
(b) (i)	
Sinéad <i>Why?</i> Values are closer to the true value	1+2
(ii)	
6.0 – 7.5	1
(iii)	
<i>Any two</i> Some nutrients stop being available to plants/ Some nutrients become available in toxic amounts/ Soil organisms cannot survive	2(2)

Q2.

Total: 20 marks

(a)	
<i>Cation</i> : positively charged particle (or positively charged ion) <i>Colloid</i> : small negatively charged particle of clay or humus.	2(2)
(b) (i)	
<i>Cation exchange</i> : swapping of positive ions on the surface of colloid particles or correct example (e.g. H <sup>+</sup> exchanged with Ca <sup>2+</sup> ) <i>Cation exchange capacity (CEC)</i> : ability of a soil to carry out cation exchange	2(2)
(ii)	
Adding humus or organic matter or FYM or compost or slurry or seaweed or green manure or liming	2
(c)	
Sieved soil sample/ high pH soil or clay-rich soil or calcium rich soil/ wash with (1%) potassium chloride solution/ through a filter/ test filtrate for Ca <sup>2+</sup> / ammonium oxalate reagent/ white ppt. indicates calcium/ potassium has replaced calcium <i>Or valid details from alternative method</i>	5(2)

Q3.

Total: 20 marks

(i)	
Aggregate/ floccule/ ped	2
(ii)	
Particles of clay are negatively charged/ cations are positively charged/ cations are held (adsorbed) to the clay particles/ sand and silt can become trapped forming larger aggregates/ water is attracted to the clay and cations, holding them together	3(3)
(iii)	
Equal volumes of water in suitable containers/ deionised water/ equal volumes of soil or clay/ add lime or named flocculant to one/ shake both for an equal amount of time/ allow to stand/ result or conclusion	3(3)

Q4.

Total: 10 marks

(i)	
Spreading lime on land	2
(ii)	
Raise pH	2
(iii)	
Calcium carbonate/ other suitable alternative	2
(iv)	
Soils should be tested prior to liming/ Should be protected from moisture during storage/ larger particles react slower than small particles/ wear gloves if using 'hydrated lime'/ stacks should be stable/ should not be stored with unsuitable fertilisers or chemicals	4