

and hence,

$$(p) = (p, \theta^2 + m\theta + n) (p, \theta^2 - m\theta + n').$$

If (2) is insoluble, $F(x)$ is irreducible and hence (p) is a prime ideal.

As an application we give a table of the prime ideal factors of certain rational primes in the number-field generated by a root θ of the equation

$$x^4 + x + 1 = 0.$$

Here $\Delta = 229$ and we get

$$(229) = (229, \theta - 75)^2 (229, \theta^2 - 79\theta - 71)$$

$$(2) = (2)$$

$$(3) = (3, \theta + 2) (3, \theta^3 + \theta^2 + \theta + 2)$$

$$(5) = (5, \theta + 2) (5, \theta^3 + 3\theta^2 + 4\theta + 3)$$

$$(7) = (7)$$

$$(11) = (11, \theta + 4) (11, \theta^3 - 4\theta^2 + 16\theta + 3)$$

$$(13) = (13)$$

$$(17) = (17, \theta - 3) (17, \theta^3 + 3\theta^2 - 8\theta - 6)$$

$$(19) = (19, \theta - 2) (19, \theta^3 + 2\theta^2 + 4\theta + 9)$$

$$(23) = (23, \theta + 4) (23, \theta + 5) (23, \theta^2 - 9\theta - 8).$$

DISSOCIATION-POTENTIALS OF NEUTRAL SOLUTIONS OF LEAD NITRATE WITH LEAD PEROXIDE ELECTRODES.

[Abstract.]

BY ARTHUR KENDRICK.

To determine if in such solutions and with lead peroxide electrodes electrolytic action takes place at voltages lower than that required for the separation of lead and lead peroxide with platinum electrodes, the method developed by Nernst¹ and Le Blanc² was made use of.

Two platinum wires coated with a thick, firm crust of lead peroxide were first used as electrodes. The current-potential curves obtained showed sharp bends at about 0.4 volt. To determine at which electrode the action at this voltage took place an electrode was made of a platinum wire projecting 1mm from a sealed glass tube. This point was coated with the lead peroxide before use each time. The other electrode con-

1. W. Nernst, Bericht. d. deutschen ch. Gesel. 30, p. 1547, 1897.

L. Glaser, Zeit. für Electrochemie, 4, p. 355, 1898.

E. Bose, Zeit. für Electrochemie, 5, p. 153, 1899.

2. LeBlanc, Zeit. für ph. Chemie, 12, p. 333, 1892.

sisted of a piece of platinum foil of several square c. m. area, coated with lead peroxide. Thus the two areas were vastly different; and nearly the whole of the polarization occurred at the point electrode, which was used successively as anode and as kathode.

When used as anode the current-potential curves showed the bend at about 0.4 volt. But used as kathode, the several curves were not in as good mutual agreement, and do not clearly indicate a particular voltage at which action at that electrode begins. The general indications are that the lead appears at a voltage considerably less than that required to separate lead on a platinum kathode, and that the peroxide is reduced. The irregularities that may mask the critical voltage seem to be due to local concentration changes around the electrode.

PbO_2 seemed to form at the anode at the voltage 0.4.

SOME OBSERVATIONS WITH RAYLEIGH'S ALTERNATE CURRENT PHASEMETER.

BY E. S. JOHNNOTT, JR.

This instrument in the field of alternate current measurements takes a place similar to that of the galvanometer in direct current measurements; with some advantages, and also with some disadvantages. For example, its indications may represent either current or electromotive force, and the angle of lag and true watts in a circuit may be obtained by a simple calculation. However, its indications, as in all other alternate current meters, vary as the square of the current; hence its range of sensibility is limited.

The principal feature of the instrument is the ease with which it gives the angle of lag of the current in a circuit behind the electromotive force impressed at its terminals. Also when once calibrated it gives all the quantities needed to determine the energy absorbed in a conductor.

Similar to the tangent galvanometer it consists of an iron magnet suspended in the field of the current whose value is required.

Fig. I is a horizontal sectional view of the form used by Lord Rayleigh. *M* represents the current coil, and is connected in series with the conductor on which the measurements are desired to be made. *S* represents the E.M.F. coil and is shunted across the terminals of the conductor.