

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF APPLIED CHEMISTRY
END OF SECOND SEMESTER EXAMINATIONS – DECEMBER 2002
ANALYTICAL CHEMISTRY – SCH 1206
TIME – (3) THREE

INSTRUCTIONS TO CANDIDATES

Answer **ANY FOUR** questions. Each question carries 25 marks.

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1. (a) Calculate the pH of an acid solution of concentration 10^{-3}M and pK_A value of 4,2.
(b) Calculate the solubility of calcium chromate (CaCrO_4) $f_w = 156,07$ in water.
 - (i) Without considering the activity coefficient.
 - (ii) Considering the activity coefficient.(c) Calculate the solubility of Barium Iodate in a solution containing $0,004\text{M}/\text{DM}^3$ Sodium Iodate.
 2. In a solution containing $0,2000\text{M}$ KMnO_4 what is the concentration (normal) in:
 - (a) in acidic solution
 - (b) in a neutral solution
 3. Draw a titration curve of 25cm^3 H_2A acid an $0,1\text{N}$ NaOH . Where;
 $\text{K}_1 = 1,2 \cdot 10^{-2}$
 $\text{K}_2 = 5,96 \cdot 10^{-7}$
 4. What is the potential of the hydrogen electrode in a $0,5\text{M}$ solution of CH_3COONa .
 5. (a) Name one of the following:
 - (i) Acid Base Indicator
 - (ii) Redox Indicator
 - (iii) Complex Formation Indicator
 - (iv) Precipitation Indicator(b) What mass of a mixture of 25% KBr , 65% KCl and 10% KNO_3 do you need to titrate $20,00\text{ ML}$ $0,1\text{N}$ $\text{Hg}(\text{NO}_3)_2$ ($f_{\text{eq}} = 1/2$).

END OF QUESTION PAPER!!!

Table of Laplace Transforms

$F(s)$	$f(t)$
$e^{-cs}/s, c > 0$	$u(t - c),$ where $u(t - c) = \begin{cases} 1 & , t \geq c \\ 0 & , t < c. \end{cases}$
$e^{-cs}F(s)$	$f(t - c)u(t - c)$
$F(s)G(s)$	$\int_0^t f(\beta)g(t - \beta) d\beta$
$F(s + a)$	$e^{-at}f(t)$
$1/s$	1
$1/s^{n+1}$	$t^n/n!$
$1/(s + a)$	e^{-at}
$1/(s + a)^{n+1}$	$t^n e^{-at}/n!$
$\frac{k}{s^2 + k^2}$	$\sin kt$
$\frac{s}{s^2 + k^2}$	$\cos kt$
$\frac{k}{s^2 - k^2}$	$\sinh kt$
$\frac{s}{s^2 - k^2}$	$\cosh kt$
$\frac{1}{(s^2 + k^2)^2}$	$\frac{1}{2k^3}[\sin kt - kt \cos kt]$
$\frac{s}{(s^2 + k^2)^2}$	$\frac{1}{2k}t \sin kt$