1-1

Y	N

1-2

Y	**N**

1-3

$(C_6H_{10}O_5)_n + nH_2O = nC_6H_{12}O_6$

1-4

Signature	A

1-5

Signature	A			
☐ <5	☐ 5–10	☐ 10–20	☐ 20–40	☐ >40

By variants

2-1

V_{Ce} = _____

By variants

2-2 a)

$C_6H_{12}O_6 + 2[Fe(CN)_6]^{3-} + H_2O = C_6H_{12}O_7 + 2[Fe(CN)_6]^{4-} + 2H^+$

2-2 b)

$Ce^{4+} + [Fe(CN)_6]^{4-} = Ce^{3+} + [Fe(CN)_6]^{3-}$

2-2 c)

$[Fe(phen)_3]^{2+} + Ce^{4+} = [Fe(phen)_3]^{3+} + Ce^{3+}$

2-3

Calculation of glucose concentration (mol/L).

According to the reaction stoichiometry, the amount of glucose equals half of the amount of hexacyanoferrate. We deal with substitutive titration (substitution of glucose by hexacyanoferrate). Then the amount of glucose equals half of that of cerium:

$$c(\text{glucose in volumetric flask, M}) = 0.5V_{Ce}c_{Ce}(\text{M})/V_{\text{glucose}} = V_{Ce}c_{Ce}/20.$$

The concentration obtained should by multiplied by the dilution factor of the unknown solution in the volumetric flask (50 / 5 = 10) to get the final answer.

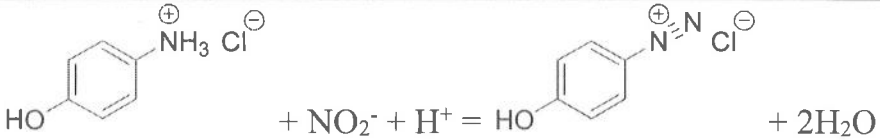
c_{glucose} = _____

3-1

V_{NaNO_2} = _____

3-2 a)

3-2 b)



3-2 c)

$2NO_2^- + 2I^- + 4H^+ = I_2 + 2NO + 2H_2O$

3-3

The amount of paracetamol is equivalent to that of 40aminophenol, while the amount of the latter is equivalent to that of nitrite consumed at the titration.

c(parac)V(parac) = $c(NO_2^-)V(NO_2^-)$

Thus:

m(parac)(mg) = $c(NO_2^-$, M)$V(NO_2^-$, mL)M(parac)V(flask) / V(aliquot)

m = _____

4-1 – 4-3

The main reactions allowing the compounds detection (other approaches also possible)

Substance	Diazotation–azocoupling	NaOH + heating	Fe^{3+} at room temperature
Phthalaszl	+ (after hydrolysis)	--	--
Aspirin	--	--	+ (after hydrolysis)
4-Amibobenzoate	+	--	(ginger coloration)
Chloramphenicol	+ (after reduction with Zn)	+ (yellow → dark)	(Blue coloration in a concentrated solution)

By variants