Date ....   Name .... Group ....

Lab report from the practical lesson on biochemistry

Topic: **Non-protein nitrogen compounds**

Task 1: Estimation of creatinine in serum and urine
Principle:

Results:

	Serum sample (Tube No 1)	Urine sample (Tube No 2)	Standard (Tube No 3)	Blank (Tube No 4)
A505				-

Calculations:

Concentration of creatinine in serum (S-Creatinine):

$$\text{S-Creatinine (μmol/l)} = \frac{A_{serum}}{A_{standard}} \times c_{standard}\ (\mu mol/l)$$

$$\text{S-Creatinine (μmol/l)} = \frac{\text{………}}{\text{………}} \times \text{……….} = \text{…………………}$$

Concentration of creatinine in the urine (U-Creatinine):

$$\text{U-Creatinine (mmol/l)} = \frac{A_{urine}}{A_{standard}} \times c_{standard}\ (mmol/l) \times \text{Dilution of urine}$$

$$\text{U-Creatinine (mmol/l)} = \frac{\text{………}}{\text{………}} \times \text{………} \times \text{………} = \text{…………………}$$

Daily output of creatinine into urine (dU-Creatinine):

> dU-Creatinine (mmol/24 hrs) = U-Creatinine (mmol/l) $\times$ Volume of urine (liters/24 hrs)

dU-Creatinine (mmol/24 hrs) = ………….. $\times$ …………….. = ……………….

Task 2: Calculation of clearance of endogenous creatinine
Principle:

Clearance of endogenous creatinine (Cl$_{Cr}$):

U   Concentration of creatinine in urine (mmol/l): ….…………..

P   Concentration of creatinine in serum (mmol/l): ……………..

V   Volume of urine per 24 hours (ml/s):   ……………..

$$Cl_{Cr} \ (ml/s) = \frac{U \times V}{P}$$

$$Cl_{Cr} \ (ml/s) = \frac{.......... \times ....}{................} = ...$$

Clearance of endogenous creatinine corrected to body surface:

m   Weight of patient in kg: ....

l   Height of patient in m: ....

$$A = 0.167 \times \sqrt{m \times l}$$

$$A = 0.167 \times \sqrt{.............. \times ....} = ...$$

$$Cl_{Cr} \ corr. \ (ml/s) = Cl_{Cr} \times \frac{1.73}{A \ (m^2)}$$

$$Cl_{Cr} \ corr. \ (ml/s) = ... \times \frac{1.73}{..........................} = ...$$

Calculation of creatinine clearance from serum creatinine using the Cockroft & Gault formula:

Gender of the patient: ....

Age of the patient: ....

$$\text{Cl}_{Cr} \text{ (ml/s)} = \text{...............} \times \frac{(140 - \text{.............}) \times \text{.............}}{44.5 \times \text{.............}} = \text{..............................}$$

Calculation of fractional excretion and tubular reabsorption of water:

a) Fractional excretion (FE) of water:

$$\boxed{FE_{H2O} = \frac{P_{creatinine}}{U_{creatinine}}}$$

$$FE_{H2O} = \frac{\text{...............}}{\text{...............}} = \text{....................}$$

b) Tubular reabsorption (TR) of water:

$$\boxed{TR_{H2O} = \frac{\text{Cl}_{Cr} - V}{\text{Cl}_{Cr}}}$$

$$TR_{H2O} = \frac{\text{...........} - \text{..............}}{\text{.................}} = \text{.......................}$$

Conclusion:
Do any of these parameters indicate impaired renal functions?
Is there a discrepancy between measured and calculated clearance that would suggest an inadequate collection of urine?

Task 3: Estimation of urea in serum and urine

Principle:

Results:

	Cuvette No. 1 Serum sample	**Cuvette No. 2** Urine sample	**Cuvette No. 3** Standard
Absorbance A_1			
Absorbance A_2			

Calculations:

Concentration of urea in serum (S-Urea):

$$\text{S-Urea (mmol/l)} = \frac{(A_1 - A_2)_{serum}}{(A_1 - A_2)_{standard}} \times c_{standard}$$

$$\text{S-Urea (mmol/l)} = \frac{\ldots\ldots}{\ldots\ldots} \times \ldots\ldots = \ldots\ldots\ldots\ldots$$

Concentration of urea in the urine (U-Urea):

$$\text{U-Urea (mmol/l)} = \frac{(A_1 - A_2)_{urine}}{(A_1 - A_2)_{standard}} \times c_{standard} \times \text{Dilution of urine}$$

$$\text{U-Urea (mmol/l)} = \frac{\ldots\ldots}{\ldots\ldots} \times \ldots\ldots \times \ldots\ldots = \ldots\ldots\ldots\ldots$$

Daily output of urea into urine (dU-Urea):

$$\text{dU-Urea (mmol/24 hrs)} = \text{U-Urea (mmol/l)} \times \text{Volume of urine (liters/24 hrs)}$$

Conclusion:

Task 4: Estimation of uric acid in serum and urine
Principle:

Results:

	Serum sample (Tube No. 1)	Urine sample (Tube No. 2)	Standard (Tube No. 3)	Blank (Tube No. 4)
Absorbance 520 nm				

Calculations:

Uric acid in serum (S-Uric acid):

$$\text{S-Uric acid } (\mu\text{mol/l}) = \frac{A_{serum}}{A_{standard}} \times c_{standard} \ (\mu\text{mol/l})$$

S-Uric acid (μmol/l) = $\dfrac{\text{………}}{\text{………}}$ × ……..… = …………………

Uric acid in the urine (U-Uric acid):

$$\text{U-Uric acid (mmol/l)} = \dfrac{A_{urine}}{A_{standard}} \times c_{standard} \text{ (mmol/l)} \times \text{Dilution of urine}$$

U-Uric acid (mmol/l) = $\dfrac{\text{………}}{\text{………}}$ × …..…… × ……..… = …………………

Daily output of uric acid into urine (dU-Uric acid):

$$\text{dU-Uric acid (mmol/24 hrs)} = \text{U-Uric acid (mmol/l)} \times \text{Volume of urine (liters/24 hrs)}$$

dU-Uric acid (mmol/24 hrs) = ………….. × …………….. = ……………….

Conclusion:

Task 5: Calculation of clearance and fractional excretion of uric acid

Principle:

Calculations:

Clearance of uric acid (Cl$_{UA}$):

U$_{UA}$ Concentration of uric acid in urine (mmol/l):   ....

P$_{UA}$ Concentration of uric acid in serum (mmol/l):   ....

V   Volume of urine per 24 hours (ml/s):   ....

$$Cl_{UA} \ (ml/s) \ = \ \frac{U_{UA} \ \times \ V}{P_{UA}}$$

$$Cl_{UA} \ (ml/s) \ = \ \frac{............ \ \times \ ....}{................} \ = \ ....$$

Fractional excretion of uric acid:

U$_{Cr}$ Concentration of creatinine in urine (mmol/l):   ....

P$_{Cr}$ Concentration of creatinine in serum (mmol/l):   ....

U$_{UA}$ Concentration of uric acid in urine (mmol/l):   ....

P$_{UA}$ Concentration of uric acid in serum (mmol/l):   ....

$$FE_{UA} \ = \ \frac{U_{UA} \ \times \ P_{Cr}}{U_{Cr} \ \times \ P_{UA}}$$

$$FE_{UA} \ = \ \frac{................ \ \times \ ....}{................ \ \times \ ....} \ = \ ....$$

Conclusion:

Task 6: Murexide reaction

Principle:

Results/observation:

Task 7: Solubility of uric acid

Principle:

Results/observation:

Conclusion: