Name................................……………………

**Acid-base Balance**

Student protocol

Plot the following situations on the "anion gap" graph:  
(a) hyperchloremia, (b) hypoproteinemia, (c) diabetic ketoacidosis, (d) anaerobic metabolism with lactate

Reference values:

pH (7.35 – 7.45)

pO2 (10 - 13 kPa)

pCO2 (4.6 – 6 kPa)

HCO3 -(22 – 26 mmol/l)

BE (-2.5 to +2.5 mmol/l)

AG (14 – 18 mmol/l)

1. A 34-year-old woman underwent resection of most of the intestine due to thrombotic occlusion of the v. mesenterica. 70 cm of proximal jejunum was left - the procedure was completed with jejunostomy. Over the next month, she lost weight from 55 to 43 kg, urinated less than 1/2 l per day, and her wound disintegrated. She changed the stoma bag after filling about 1/2 l of contents, more than 8 times a day. Physical findings are suggestive of severe dehydration and malnutrition.

Initial laboratory examination: Na+ 124 mmol/l, K+ 3,9 mmol/l, Cl- 69 mmol/l, …

Astrup:

pH 7,550

pCO2 7,2 kPa

pO2 7,7 kPa

HCO3- 42 mmol/l

BE +18 mmol/l

**Determine the type of ABB disorder. What is the likely cause?**

2. A 26-year-old man (65 kg) was admitted with severe head injuries following a car accident. He was on a ventilator, breathing a mixture with 40% oxygen – tidal volume was set at 600 ml, entilátory rate was set at 18/min.

Astrup taken after 30 min on this ventilatory mode looked as follows: pH 7,490

pCO2 1,86 kPa

pO2 16,2 kPa

HCO3- 24 mmol/l

BE +6,8 mmol/l

**Explain the type and cause of the ABB disorder.**

3. A 68-year-old K.M., homeless, was admitted unconscious. According to the police, he was found in a park. Physical findings without significant pathology except for deepened breathing, respiratory rate 20/min.

Input lab: Na+ 141 mmol/l, K+ 5,8 mmol/l, Cl- 103 mmol/l, Glycaemia 7,4 mmol/l, Urea 6,98 mmol/l, Creatinine 114 μmol/l, ALT 19,5 μkat/l, AST 25,3 μkat/l

Urine: pH 4.5, otherwise normal findings (negative glucose, ketone bodies, protein)

(Toxicology was positive for ethylene glycol)

Astrup:

pH 7,010

pCO2 2,1 kPa

pO2 12,2 kPa

HCO3-11 mmol/l

BE -16 mmol/l

**Identify the type of ABR disorder. Explain the deepened breathing.**

**Calculate the anion gap. Which substances may be responsible for the increase in AG?**

4. Marie M., a 72-year-old patient who has been treated for chronic obstructive pulmonary disease for years, was now admitted for shortness of breath. She has been febrile for about 3 days, coughing.

Entry Astrup:

pH 7,325

pCO2 7,42 kPa

pO2 6,42 kPa

HCO3- 30,1 mmol/l

BE -7,2 mM

**What type of ABR disorder is it?**

**What would you expect the urine pH to be in this patient?**

Teacher's signature: ……………………………………………..