**Background of drugs:**

Xylazine is an alpha-2 blocker which is a potent nonnarcotic sedative and analgesic as well as muscular relaxant. It does not increase the degree of sedation but it increases the duration of the effect of sedation. Its effects include sedation and CNS depression, muscle relaxation, initial increased blood pressure, bradycardia, a respiratory depressant at high doses and polyuria. Gastrointestinal motility is decreased and bloat may develop, while diarrhoea may be observed 12–24 hours after sedation. Following intramuscular injection onset of action 5 to 10 minutes, maximum effect 15 minutes. Pre-treatment with atropine may be used to decrease the bradycardia and hypersalivation.

Ketamine inhibits GABA and may also block serotonin, noradrenaline, and dopamine in the central nervous system. It is used as a general anesthetic and produces profound analgesia without muscle relaxation.

**Calculations of drug volumes:**

(Dose of drug \* weight of cow)/Concentration of drug

Xylazine: 0.025\*500/20= 0.625ml

Ketamine: 0.05\*500/100 = 0.25ml

**Additional calculations:**

0.54% Atropine: 0.04\*500/0.54= 37ml

10% Tolazonine: 0.05\*500/100= 0.25ml (2 times the dose of xylazine)