Second 2009
VIVA 4

This is an analysis of urine from a patient on the intensive care unit:
Glucose negative Ketones trace pH 6.0
urobilinogen moderate Specific gravity >1.030

In this viva candidates were asked to explain the physiological basis to the urinanlysis provided above. Further knowledge was sought in reference to ketones and ketone body generation and metabolism, generation of urobilinogen and significance of specific gravity.

"What is specific gravity?"

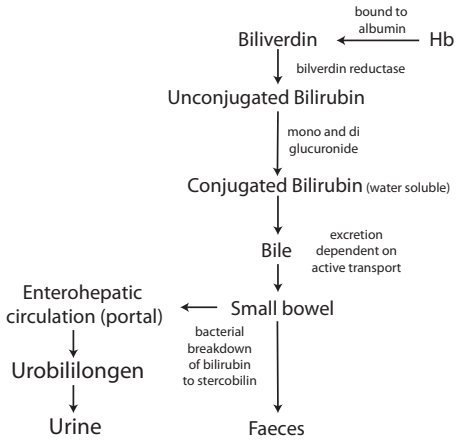
defined as the weight of the solution compared with that of an equal volume of distilled water
urine osmolality of 280 mosmol/kg is usually associated with a urine specific gravity of 1.008 or 1.009

"Discuss the significance of these results"

as bilirubin excretion in bile increases in states of bilirubin overproduction, more urobilinogen appears in the stool and urine. However, the amount of urobilinogen in stool and urine is not proportional to bilirubin excretion since conversion of bilirubin to urobilinogen is not quantitative

urine osmolality is determined by the number of particles in the urine (eg, urea, sodium, potassium), while the specific gravity is determined by both the number and size of the particles in the urine. This becomes important clinically when there are large molecules in the urine, such as glucose or radiocon trast media. In these settings, the specific gravity can reach 1.030 to 1.050 (suggesting a highly concen trated urine) despite a urine osmolality that may be dilute to plasma.

"Outline the metabolism of bilirubin"



"How do bilirubin levels change with disease?"

Intrahepatic disease
- Plasma levels
  - total bilirubin, unconjugated and conjugated all elevated
- Urine levels
  - increased urobilinogen, increased conjugated

Post hepatic disease
- Plasma levels
  - total bilirubin, conjugated bilirubin elevated, unconjugated unchanged
- Urine levels
  - increased conjugated bilirubin, decreased urobilinogen