

**1** State the correct term for the following definitions:

**a** the maintenance of a constant internal environment in a mammal  
..... (1 mark)

**b** an animal whose temperature mainly fluctuates as a result of behavioural responses  
..... (1 mark)

**c** response to a change that increases the degree of change  
..... (1 mark)

**d** part of the brain which detects changes in the temperature and water potential of the blood  
..... (1 mark)

**e** series of reactions that form urea in the liver  
..... (1 mark)

**2** Describe the difference between:

**a** receptors and effectors  
.....  
..... (2 marks)

**b** excretion and osmoregulation  
.....  
..... (2 marks)

**c** blood in the renal artery and blood in the renal vein.  
.....  
.....  
..... (3 marks)

**3 a** Look at the image on the photo support sheet, it shows a photomicrograph through the centre of a lobule of a mammalian liver.

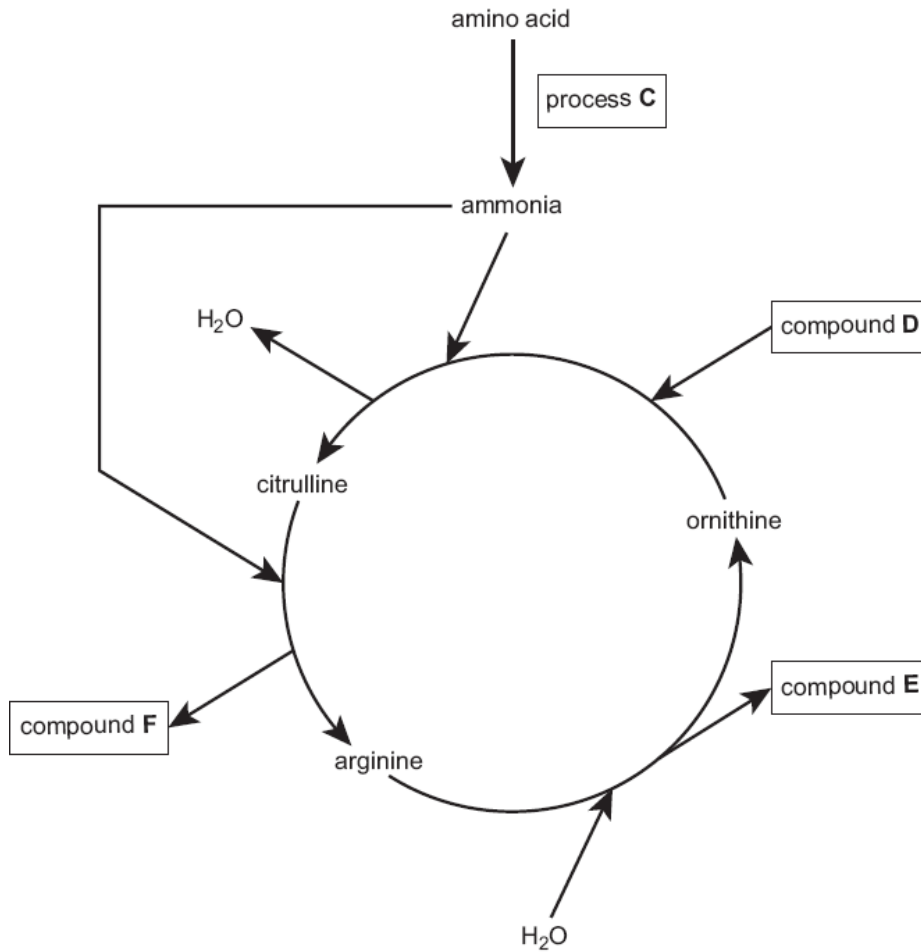
i Name the type of vessel labelled B.

..... (1 mark)

ii Name the cells that make up the lobule.

..... (1 mark)

b Figure 1 outlines the formation of urea in the liver.



**Figure 1**

Using Figure 1 identify process C, compound D, compound E, compound F.

.....  
 .....  
 .....  
 ..... (4 marks)

**c** The urea formed in the ornithine cycle will be excreted from the body in urine. Urine also contains other chemicals. Procedures have been developed to test for the presence of some of these chemicals, such as hormones.

**i** A pregnancy testing kit contains a testing 'stick' to detect a hormone in the urine. Explain how the stick detects this pregnancy hormone.

.....  
 .....  
 .....  
 ..... (4 marks)

**ii** The urine of some high profile athletes has been tested and found to contain abnormally high levels of banned steroids or their metabolites. The pressure on these elite athletes to succeed in their sport leads some of them to resort to the use of these performance-enhancing steroids. Comment on whether the use of steroids should be permitted in sport.

.....  
 .....  
 ..... (3 marks)

*OCR Biology A, June 2010, Specimen paper*

**4 a** Table 1 compares the composition of blood plasma and the glomerular filtrate formed in the nephrons of the kidney.

Molecule or ion	Concentration/g dm <sup>-3</sup>	
	In blood plasma	In glomerular filtrate
Water	900.0	900.0
Protein	80.0	0.0
Glucose	1.0	1.0
Amino acids	0.5	0.5
Urea	0.3	0.3
Inorganic ions	7.2	7.2

**Table 1**

**i** Calculate the percentage of protein in the plasma and in the glomerular filtrate.

.....

.....  
 ..... (3 marks)

**ii** Explain the reason for the difference in the figures you calculated in part **i** with reference to the structure of the glomerulus and Bowman’s capsule.

.....  
 .....  
 ..... (3 marks)

**iii** Name the kidney tissue within which the glomeruli are situated.

..... (1 mark)

**b** Table 2 compares the total masses of substances in the glomerular filtrate and in the urine over a 24-hour period.

Substance	Mass in glomerular filtrate/g	Mass in urine/g
Sodium	550.0	5.0
Potassium	27.0	2.0
Calcium	5.0	0.2
Ammonia	0.3	0.75
Glucose	180.0	trace
Urea	60.0	35.0
Water	180 000.0	1 500.0

**Table 2**

**i** Use Table 2 to calculate the concentration of urea in the glomerular filtrate and in the urine.

1 g of water occupies 1 cm<sup>3</sup>

.....  
 .....  
 .....  
 ..... (4 marks)

**ii** Describe and explain how the mass and concentration of urea changes between the Bowman’s capsule and the ureter.

.....  
.....  
.....  
..... (4 marks)

**5 a** Explain why the homeostatic control of oxygen, carbon dioxide, glucose, and temperature are necessary in a mammal.

.....  
.....  
.....  
..... (4 marks)

**b** Describe how homeostatic control of temperature and water in a mammal are interlinked.

.....  
.....  
..... (3 marks)