Instructions:

- Residents & Fellows: To complete the following questions, you may use textbooks, journals, & other written resources, but not the assistance of any other individual. After your work is completed, give your answers to your Mentor for grading and schedule a time for discussion.
- Remember that your typewritten, corrected Benchmark & the Certification statement must be received by the Executive Secretary no later than May 30, 2008 (Residents/Fellows who began training in January 2008).
- Give approximate normal values for the following physiologic parameters in a normal, resting 500 kg horse living at sea level, breathing room air.
  - For measured parameters, give a single value within the reference range. Include units of measure. Your answer must be reasonable for this patient and consistent with your other answers.
  - For parameters that must be calculated from measured values, use your answers for the measured values.
  - Show both the formula and your calculations and include units.

Systolic arterial blood pressure

Diastolic arterial blood pressure

Mean arterial blood pressure

Central venous pressure

Right ventricular pressure – systolic

Mean pulmonary artery pressure
Pulmonary artery occlusion pressure (wedge pressure)

Left atrial pressure – during ventricular systole

Left ventricular pressure – systolic

Cardiac index

Cardiac output

Heart rate

Stroke volume

Systemic vascular resistance

Packed Cell Volume

Hemoglobin concentration

Saturation of hemoglobin with oxygen in arterial blood (see level at room air)
Arterial oxygen content. What would it be if the animal was taken to 10,000 feet altitude?

Oxygen Delivery

Total body water

Intracellular fluid volume. Please list here the intracellular fluid volume for a foal.

Extracellular fluid volume. Please list here the extracellular fluid volume for a foal.

Blood volume. Please list here the normal blood volume for a foal.

Plasma volume

Plasma oncotic pressure (Colloid osmotic pressure)

Plasma osmolality

Renal blood flow

Urine output
Although many factors influence tissue oxygenation and homeostasis, maintenance of effective circulating volume and blood pressure are vital to ensure normal perfusion. Based on the following diagram, list the determinants for arterial blood pressure. For each parameter (2-7), name one mechanism by which each can create or contribute to hypotension. Then name one method whereby each parameter can compensate for the presence or development of hypotension.
Please explain the concept of ‘effective circulating volume’ and describe the roles both the arterial and venous circulation play in contributing and maintaining this vital homeostatic mechanism.

What clinical condition is associated with high intravascular volume but low effective circulating volume?
Where are the receptors in the great vessels that sense changes in effective circulating volume?

Describe how great vessel baroreceptors sense a decrease in effective circulating volume and the resulting physiologic response.

Where are the receptors in the kidney that sense changes in effective circulating volume?

Describe how renal receptors sense a decrease in effective circulating volume and the resulting physiologic response.