



The Hong Kong College of Anaesthesiologists Intermediate Fellowship Examination Written Paper in Physiology

**February 19, 2010
09:00 - 11:00**

1. Define hypoxic pulmonary vasoconstriction and explain the underlying mechanisms. How does anaesthesia affect hypoxic pulmonary vasoconstriction?
2. Classify the possible causes of early postoperative hypotension, giving relevant examples.
3. Write short notes on the production and physiological functions of red blood cells.
4. Explain the Frank-Starling Mechanism and describe its underlying mechanisms. How does this knowledge affect fluid administration during anaesthesia?
5. Outline the factors affecting glomerular filtration.
6. Outline the physical principles of electrocardiography and the possible sources of errors. What is the difference between monitor mode and diagnostic mode?
7. Explain why dependant airway closure occurs and outline its effects on arterial pO_2 . Using the single breath nitrogen washout test, explain how closing volume can be measured.
8. Outline the synthesis, composition and physiological role of pulmonary surfactant.
9. Explain how the Gibbs-Donnan equilibrium contributes to the development of the resting membrane potential.
10. With the aid of a clearly labelled diagram, illustrate the structure and functions of the juxtaglomerular apparatus of the kidney.
11. Outline the metabolic, fluid and electrolyte abnormalities in a patient with diabetic ketoacidosis.
12. Outline factors that determine cerebral blood flow. How are these factors altered by anaesthesia?