



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

Friday, 17 July 2009, 09:00 - 11:00

The questions carry equal marks. Answer ALL of them.

1. Compare and contrast the sequence of events during the generation of action potential in a standard cardiac myocyte with that of a nerve cell.
2. Describe the mechanisms by which respiration is controlled.
3. How is acid produced by the stomach, and what are the main mechanisms by which its secretion is regulated?
4. What factors control the movement of fluid between the intravascular and the interstitial spaces at the capillary level?
5. Outline the processes that result in haemostasis after injury to a blood vessel.
6. Outline the mechanisms for temperature regulation by the body.
7. What are the respiratory and cardiovascular changes after complete transection of the spinal cord at C6 level?
8. Outline the mechanisms by which the kidney maintains potassium homeostasis.
9. With respect to infrared capnography,
 - (1) Outline the physical principles for measuring carbon dioxide concentration in a gas mixture.
 - (2) Illustrate, with the aid of clearly labelled diagrams, the capnographic appearances of the following situations:
 - a. A patient with bronchospasm receiving mechanical ventilation
 - b. Significant gas leak when using an uncuffed endotracheal tube to ventilate a paediatric patient
10. Explain the effects of severe aortic stenosis on myocardial oxygen supply and demand. Draw a pressure volume loop of the left ventricle illustrating the effects of severe aortic stenosis.
11. Define intracranial pressure (ICP), and explain the Monroe Kellie Doctrine. In a patient with head injury, what are the factors that can increase ICP?
12. Outline the physiological effects of morbid obesity on the cardio-respiratory system.

END OF PAPER