



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

Friday, 1st August 2014, 09:00 - 11:00 h

The questions carry equal marks. Answer ALL of them. For questions with multiple parts, allocation of marks is indicated in the brackets.

1. Describe briefly the mechanisms of excitation-contraction coupling within a skeletal muscle fibre (70%). Explain the molecular basis for the manifestations of malignant hyperthermia (30%).
2. Explain, in physiologic terms, the effects of severe aortic stenosis on left ventricular myocardial oxygen supply and demand.
3. List the mechanisms of transport across the placenta (10%). Explain the factors that affect oxygen transport across the placenta (90%).
4. What are the sources of glucose in the blood (30%)? What are the mechanisms involved in the uptake and transfer of glucose from the small bowel to cells (70%)?
5. With regard to blood gases measurement, describe how pH could be measured in an arterial blood sample (70%). Outline the potential sources of errors (30%).
6. Briefly explain the factors that determine arterial pulse pressure.
7. Describe the components of static compliance in the respiratory system (30%). Explain the interplay of these components (70%).
8. Explain the mechanisms that prevent clotting of blood within a normal blood vessel.
9. Outline the pathophysiology of acute anaphylactic reactions with reference to the mediators released and their effects.
10. How does an increase in arterial carbon dioxide tension (PaCO_2) affect alveolar ventilation (80%)? Briefly discuss factors that affect response of alveolar ventilation to PaCO_2 (20%).
11. Discuss the physiologic effects (50%) and responses (50%) after rapid ingestion and complete absorption of 2 litres of pure water in a 70 kg man.
12. Describe how the head-down position affects intracranial pressure and cerebral blood flow.

END OF PAPER