



The Hong Kong College of Anaesthesiologists

Intermediate Fellowship Examination

Written Paper in Physiology

16 July 2021 (Friday)

09:00 - 11:30 hours

1. How does the core temperature change during general anaesthesia (50%)? What are the effects of general anaesthesia on thermoregulation (50%)?
2. Describe and explain the cardiovascular effects of the Valsalva Maneuver in a healthy adult (70%). Explain how the effects will be different in a patient with congestive cardiac failure (30%).
3. Explain the changes in the cardiovascular physiology of a morbidly obese person.
4. Describe the physiological effects of glucocorticoids.
5. Describe the characteristics of the utero-placental circulation (30%). Discuss the determinants of utero-placental blood flow and the factors that decrease utero-placental blood flow (70%).
6. Outline the physiological processes through which the kidney handles acid-base balance in a patient with severe metabolic acidosis.
7. How is alveolar partial pressure of oxygen calculated (30%)? What is the normal gradient between the alveolar partial pressure of oxygen (P_{AO_2}) and the arterial partial pressure of oxygen (P_{aO_2})? Explain the mechanisms that cause an elevated gradient (70%).
8. Define mixed venous oxygen saturation (20%). Briefly describe the factors that influence oxygen saturation of mixed venous blood (80%).
9. Describe briefly the classic Starling equation (30%). Explain how the “revised” Starling equation with glycocalyx considered as a major determinant of vascular permeability is different from the classic Starling equation (70%).
10. List the information derived from the arterial pressure waveform (40%). Briefly explain the phenomenon of resonance and its implications on invasive blood pressure measurement (60%). (Algorithm and graphs are not required)

11. In the respiratory system, what are the definitions of anatomical, alveolar and physiological dead space? (20%). What factors may alter anatomical and alveolar dead space respectively (50%)? Describe the physiological impact of increased dead space (30%).
12. Outline the motor and sensory pathways involved in withdrawing the lower limb from a painful stimulus.

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