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

Friday, 14 July 2017, 09:00 - 11:00

The questions carry equal marks. **ALL** questions **by using ink or ball-point pen**. For questions with multiple parts, allocation of marks is indicated in the brackets.

1. Outline the key features of the coronary circulation (50% marks). Explain the factors that determine myocardial oxygen delivery (50% marks).

2. Describe the mechanisms for the control of lung ventilation (60% marks). Explain how these mechanisms may be affected in chronic hypercapnoea (40% marks).

3. Outline the factors that regulate extracellular fluid volume.

4. Describe the metabolic changes that would occur if a healthy adult starves for 2 weeks.

5. How do the changes at term pregnancy affect the effectiveness of preoxygenation at induction of anaesthesia?

6. Define intracranial pressure and explain the Monroe-Kellie doctrine (50% marks). Define the Cushing's triad and briefly outline its underlying physiological basis (50% marks).

7. How does the countercurrent multiplier system in the Loop of Henle in a kidney nephron generate an osmotic gradient in the medullary interstitium?

8. In a patient with hypoxaemia, outline the response to inhaled enriched oxygen in the following conditions: (1) hypoventilation (30% marks) (2) increase in ventilation perfusion mismatch (30% marks) (3) increase in shunting (40% marks).

9. Outline the process of "type and screen" and "cross-match" used in compatibility testing of blood transfusion.

10. Describe the cardiovascular responses to a Valsalva manoeuver in: (1) a healthy adult (50% marks) and (2) a patient with congestive heart failure (50% marks).

11. Write short notes on the hormones that are produced by the kidneys.

12. Explain the principles underlying the use of electroencephalography to monitor depth of anaesthesia (40% marks). Discuss the advantages and disadvantages of using "processed electroencephalography" to perform this function (60% marks).

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