



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

Friday, 31st July 2015, 09:00 - 11:00

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

1. Describe the cardiovascular effects of a previously healthy adult man who becomes bedridden for 2 weeks.
2. Outline the sources of energy used by skeletal muscles at rest, during and after exercise.
3. Define dead space during spontaneous tidal ventilation. (30%) Describe how anatomical and physiological dead space can be measured. (70%)
4. (i) Outline the pathophysiology of carbon monoxide poisoning. (50%)

(ii) Describe the physiological effects of administering 100% oxygen at atmospheric pressure and at hyperbaric pressure of 3 atmospheres in a patient with carbon monoxide poisoning. (50%)
5. Outline the effects on tissue oxygen delivery in a 50 kg healthy woman with baseline haemoglobin concentration of 10 g/dL, who lost 1 litre of blood and is replaced with 1 litre of colloid solution intravenously.
6. Outline the factors, with brief explanation, that will affect the accuracy of invasive arterial pressure monitoring.
7. (i) What are the normal values of (1) total cerebral blood flow (2) regional variations in white and grey matters? (10%)

(ii) How does cerebral blood flow vary in response to changes in cerebral perfusion pressure, arterial pCO₂ and pO₂? (90%)
8. Describe the central control (50%) and different physiological phases of vomiting (50%).
9. Outline the factors that control the movement of fluid between the intravascular and the interstitial spaces at the capillary level.
10. Describe the regulation and movement of sodium ions at the renal tubules during hypovolemic shock.
11. Outline the physiological effects of perioperative hypothermia (core temperature < 36 degree Celsius).
12. Outline the physiological effects of cortisol (50%). How is its secretion regulated? (50%)

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