**Train of Thought / Show Me the Money Exercise**

There are 2 parts to this exercise:

a) Question interpretation

1. Identify the focus
   1. What is the question, at its core, really asking about?
2. Identify the context
   1. What aspect about the focus does the question want you to highlight?
3. Relate the focus to the context
   1. Re-write the question as an “expanded” question, which specifically and individually addresses all the points that the original question implies
   2. Try to leave no room for misinterpretation of the question

b) Structure planning

1. Introduction
   1. Identify the key points from the focus and context
   2. Write out an introduction that addresses those key points
2. Body
   1. Plan out an answer structure that addresses all aspects of the expanded question, without going into detail
3. Identify what would NOT be relevant to answering the question
   1. What related info might you be tempted to put in your answer, that does not actually answer the question asked?

Examples:

2017B Describe the pharmacodynamics properties of propofol EXCLUDING its effects on the central nervous system. Describe how these influence clinical use.

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| --- | --- |
| Focus | Pharmacodynamics of propofol (excluding CNS effects) |
| Context | How pharmacodynamic properties influence clinical use |
| Expanded question | List the pharmacodynamics effects of propofol in each organ system, excluding the CNS, and explain how these effects will influence its clinical use, in terms of drug selection (indications and contraindications) and dose selection. When would you choose propofol over another anaesthetic agent and vice versa? How do patient factors (extremes of age, co-morbidities) affect propofol use? |

|  |  |
| --- | --- |
| Intro key points | Propofol, pharmacodynamics, clinical use |
| Intro | Propofol is a commonly used, phenol derivative, iv anaesthetic agent that acts mainly via GABA receptors in CNS  (note that a generic intro on propofol would be out of place because it wouldn’t specifically address the question, eg  Propofol –  Phenol derivative  1% soya bean oil and egg phosphatide oil in water emulsion  Presented as 200mg in 20ml in glass ampoule) |
| Body | System by system   * CVS – HR, SVR, contractility * Resp – resp drive, reflexes * GIT – nausea * Immune – potential for anaphylaxis, egg allergy? * Other – pain on injection   Make a comment for each system about how this influences use |
| Not relevant | * CNS effects * Pharmacokinetics and effect on clinical use |

2017A Discuss the physiological consequences of total spinal anaesthesia caused by intrathecal administration of 20 ml of 2% lignocaine at the L3/4 level. (Do not include management) (29%)

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| --- | --- |
| Focus | Physiological consequences of total spinal anaesthesia |
| Context | intrathecal administration of 20 ml of 2% lignocaine at the L3/4 level |
| Expanded question | If 20ml of 2% lignocaine is injected intrathecally at the L3/4 level  a) Where will it spread?  b) What will it block and what will be the physiological effects? Focus on total spinal anaesthesia over usual clinical spinal anaesthesia (do not include clinical management)  c) What homeostatic reflexes will occur in response?  Comment on the choice of drug and dose. |

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| --- | --- |
| Intro key points | Total spinal anaesthesia, 20ml 2% lignocaine |
| Intro | Total spinal anaesthesia refers to a spinal block that extends up to and blocks the brainstem. It would not be unexpected after intrathecal injection of 20ml 2% lignocaine as this is an unusually large spinal dose. |
| Body | * Block sympathetic, sensory, motor fibres * Vasodilation → barorec reflex * Block of cardio-accelerator fibres T1-2 level * Brainstem – resp centre, consciousness * Duration of block – lig vs bup |
| Not relevant | * Clinical indications for spinal anaesthesia * Clinical management of total spinal |

For each of the following SAQs, apply the above template:

**Explain the physiological factors that may lead to a decrease in mixed venous blood oxygen saturation.**

|  |  |
| --- | --- |
| Focus |  |
| Context |  |
| Expanded question |  |

|  |  |
| --- | --- |
| Intro key points |  |
| Intro |  |
| Body |  |
| Not relevant |  |

**Outline the physiological changes that may explain why an otherwise well patient may have a reduced urinary output intraoperatively.**

|  |  |
| --- | --- |
| Focus |  |
| Context |  |
| Expanded question |  |

|  |  |
| --- | --- |
| Intro key points |  |
| Intro |  |
| Body |  |
| Not relevant |  |

**Describe the methods of determining depth of neuromuscular block and list the advantages and limitations of each.**

|  |  |
| --- | --- |
| Focus |  |
| Context |  |
| Expanded question |  |

|  |  |
| --- | --- |
| Intro key points |  |
| Intro |  |
| Body |  |
| Not relevant |  |

2010A09Pass Rate: 30%

**Explain the physiological factors that may lead to a decrease in mixed venous blood oxygen saturation.**

This question required candidates to explain a decrease in mixed venous oxygen saturation.   
  
The key issue in this question is the fact that the value of mixed venous saturation is the result of a balance between oxygen delivery to the cells (oxygen flux) and cellular consumption of oxygen. The net value of mixed venous saturation can thus be explained by unpacking the elements of delivery and consumption, and explaining how their variation results in a change in mixed venous saturation. Not acknowledging this issue made it difficult for candidates to accumulate sufficient marks to pass the question.   
  
A significant number of candidates approached this by providing flux equations or variants of Fick's Law. This readily identified the elements, and their contributions could be clearly explained. These candidates tended to comfortably accumulate sufficient marks to pass. However, some candidates spent significant time on detailed derivations of formulae, leaving less time to address more important aspects or to accumulate bonus marks for more detailed information. Further, detailed derivations not uncommonly introduced simple errors. Simply using a formula or equation to identify the elements or principles involved was sufficient.   
  
Many candidates did not identify this basic principle of supply and demand, and therefore struggled to pass the question. Instead, a significant number of candidates focused on details such as the oxygen dissociation curve in both arterial and venous blood, sometimes in great depth and with detailed figures. Some candidates focused on little else. The time spent on this aspect left little opportunity to address more fundamental issues.   
  
It was notable that the terms oxygen tension, saturation and content were used carelessly in a significant number of answers. These are fundamental issues at this level of physiology.

2015B08Pass Rate: 63.6%

**Outline the physiological changes that may explain why an otherwise well patient may have a reduced urinary output intraoperatively.**

This was a repeat question from the last exam and the pass rate trebled. The question requested a physiological outline incorporating basic sciences to explain this normal intraoperative occurrence.   
  
Answers that were based on the basics of Glomerular Filtration Rate and Tubular Reabsorption and how these are altered by the clinical situation and neuro-humoural responses scored well. This was because they tended to “outline physiological changes that may explain why an otherwise well patient may have a reduced urinary output intraoperatively”. However, answers that were based on generic pre-renal, renal and post-renal causes of oliguria often strayed into an imprecise clinical discussion ignoring the basic science physiological changes that were requested and did not score well. This was different to the responses provided by candidates in the previous examination when the examiners report stated that this was a successful answer plan in that cohort. Once again, discussions of pathology and surgical misadventure went unrewarded as the question states that the patient is otherwise well.

2010A02Pass Rate: 64%

**Describe the methods of determining depth of neuromuscular block and list the advantages and limitations of each.**

This question covers material asked in previous questions.   
  
The main points expected for a pass include:   
  
Neuromuscular blockade can be assessed by both clinical means and by using the nerve stimulator. Some examples of clinical means (eg head lift for 5 seconds) was expected, however clinical methods are unreliable.   
  
The characteristics of the required impulses from the nerve stimulator afforded the candidates points.   
  
Marks were awarded for the different modes of stimulation, such as single twitch, train of four count and ratio, double burst stimulation, tetany and post tetanic count. It was expected that candidates would describe their requirements, their advantages and disadvantages and how best to clinically utilise them for e.g. for reversal, in deep block.   
  
Some candidates went into great detail about the neuromuscular junction, which afforded them no marks.   
  
The concept that the strength of the muscular twitches produced is related to receptor occupancy by the neuromuscular blocker and at what levels of occupancy one could expect how many twitches. A few candidates did not appreciate that with a train of four count of 4, there was still a 70% receptor occupancy by the drug. Some thought that with a post tetanic count of 10, it was reasonable to reverse the patient with conventional reversal agents.   
  
Bonus marks were awarded if there was demonstration of how the depolarising and non-depolarising blocks differed in their responses to the nerve stimulator, the different sensitivities of different muscle groups to the neuromuscular blocker and mention of acceleromyography or more sophisticated methods. Use of diagrams implied understanding and where appropriate, garnered marks. Some candidates were confused about the TOF ratio, saying it was the ratio of the height of the first twitch compared to the fourth twitch