

## SAQ – Example Questions

### Question 1

A 45-year-old man has a major haemorrhage following significant trauma and is admitted to your emergency department. He does not have a head injury.

- a) Give one definition of major haemorrhage. (1 mark)
- b) What are the principles of management of major haemorrhage in this patient? (11 marks)
- c) What complications might follow a massive blood transfusion? (5 marks)

Answers	Marks for each (max)
<p>a)</p> <p>Candidates must give one of these definitions to get the mark</p> <ul style="list-style-type: none"> <li>• Loss of &gt; one blood volume within 24 hours (approx 70ml/kg, &gt;5L in 70 kg adult)</li> <li>• 50% of total blood volume lost in less than 3 hours</li> <li>• Bleeding in excess of 150 ml/minute</li> <li>• Bleeding leading to a systolic blood pressure of &lt;90mmHg and pulse of &gt;110bpm</li> </ul>	<b>1</b>
<p>b)</p> <ul style="list-style-type: none"> <li>• Ensure appropriate team members are contacted (not just "call for help")</li> <li>• Activation of major haemorrhage protocol</li> <li>• Identification of source of bleeding</li> <li>• Control/prevention of further blood loss</li> <li>• High flow oxygen/airway control</li> <li>• Establish IV or IO access</li> <li>• Baseline bloods</li> <li>• Frequent measurement of Hb &amp; coagulation using point-of-care tests – TEG / ROTEM / Haemocue / arterial blood gases to direct transfusion (must mention POC tests)</li> <li>• Frequent measurement and correction of electrolyte abnormalities</li> <li>• Transfusion of blood and coagulation products to restore organ perfusion</li> <li>• Strict compliance with patient identification procedures, product handling &amp; traceability</li> <li>• Measures to maintain/achieve normothermia</li> <li>• Consider imaging and/or damage control surgery</li> <li>• Consider the use of anti-fibrinolytics eg tranexamic acid</li> </ul>	<b>11</b>
<p>c)</p> <ul style="list-style-type: none"> <li>• Coagulopathy</li> <li>• Acid base abnormalities</li> <li>• Hypothermia</li> <li>• Circulatory overload</li> <li>• Electrolyte abnormalities - hypocalcaemia, hyperkalaemia/hypokalaemia hypomagnesaemia, citrate toxicity (give 3 to get the mark)</li> <li>• Transfusion related lung injury (TRALI)</li> <li>• Immediate haemolytic transfusion reactions and non-haemolytic febrile reactions</li> <li>• Allergic reactions</li> <li>• Transfusion related infections</li> <li>• Transfusion related graft-vs-host disease</li> <li>• Immunomodulation</li> </ul>	<b>8</b>

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**Question 2**

- a) What are the factors associated with an increased risk of accidental awareness under general anaesthesia (AAGA)? (14 marks)
- b) What monitoring devices can be used to help reduce the incidence of AAGA? (2 marks)
- c) What are the possible consequences to the patient of an episode of AAGA? (4 marks)

<b>Answers</b>	<b>Marks for each (max)</b>
<p>a)</p> <ul style="list-style-type: none"> <li>• Use of thiopentone as induction agent</li> <li>• Use of rapid sequence induction</li> <li>• Obesity</li> <li>• Younger adults</li> <li>• Females&gt;males</li> <li>• Obstetric surgery</li> <li>• Cardiothoracic surgery</li> <li>• Neurosurgery</li> <li>• Emergency/out of hours anaesthesia</li> <li>• Use of neuromuscular blocking agents</li> <li>• TIVA</li> <li>• Specialist procedures e.g. rigid bronchoscopy</li> <li>• Patient transfers</li> <li>• Previous history of awareness</li> <li>• Difficult airway management</li> <li>• Anaesthetist seniority (junior trainees)</li> <li>• Equipment malfunction</li> </ul>	<b>14</b>
<p>b)</p> <ul style="list-style-type: none"> <li>• Neuromuscular function monitoring</li> <li>• End tidal volatile agent monitoring</li> <li>• Processed EEG monitoring</li> </ul>	<b>2</b>
<p>c)</p> <ul style="list-style-type: none"> <li>• Nil - particularly if no pain experienced</li> <li>• Anxiety &amp; depression</li> <li>• Flashbacks</li> <li>• Post traumatic stress disorder</li> <li>• Litigation</li> <li>• Avoidance of medical departments in the future</li> <li>• Fear of future anaesthesia</li> </ul>	<b>4</b>

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### Question 3

A 74-year-old patient is scheduled for a primary total hip replacement.

a) What are the potential benefits of an enhanced recovery ("fast-track") programme for this type of surgery? (4 marks)

b) List the preoperative (6 marks), intraoperative (7 marks) and postoperative (3 marks) measures that should be included in the enhanced recovery programme for this patient.

Answers	Marks for each (max)
<p>a)</p> <ul style="list-style-type: none"> <li>• Early mobilisation (operative day if possible)</li> <li>• Decreased postoperative complications esp. cardiopulmonary</li> <li>• Decreased length of hospital stay</li> <li>• Cost reduction/ improved efficiency</li> <li>• Improved patient experience</li> </ul>	<b>4</b>
<p>b1) Preoperative:</p> <ul style="list-style-type: none"> <li>• Appropriate patient selection</li> <li>• Patient education &amp; motivation by multi-disciplinary team.</li> <li>• Patient is given clear plan of care and discharge (diary).</li> <li>• Preop optimisation of co-morbidities (eg stop smoking and weight reduction)</li> <li>• Admit on the day of surgery (staggered admissions if possible)</li> <li>• Use of carbohydrate loading (clear complex carbohydrate drinks)</li> <li>• Clear fluids up to 2hrs preoperatively/adequate hydration</li> <li>• Appropriate analgesic premedication e.g. pregabalin, gabapentin, paracetamol +/- NSAIDs</li> </ul>	<b>6</b>
<p>b2) Intra-operative</p> <ul style="list-style-type: none"> <li>• Surgical technique: minimise operative time, avoidance of drains</li> <li>• Fluid management: targeted fluid replacement</li> <li>• Spinal anaesthesia +/- IT opiates and/or sedation</li> <li>• Avoid urinary catheter</li> <li>• Use of quick offset anaesthetic agents to allow rapid recovery</li> <li>• High volume low dose LA infiltration, systematic infiltration of all tissue layers</li> <li>• Avoidance of nerve blocks causing motor block</li> <li>• Intra-op opiate sparing adjuncts such as Mg<sup>2+</sup>, lidocaine &amp; ketamine</li> <li>• Tranexamic acid intra-operatively</li> <li>• Prevention of PONV</li> <li>• Use long acting opioids sparingly</li> <li>• Maintenance of normothermia</li> </ul>	<b>7</b>
<p>b3) Postoperative</p> <ul style="list-style-type: none"> <li>• Use of multimodal analgesia/oral opioids (avoid PCA)</li> <li>• Encourage oral fluids early and early nutrition</li> <li>• Planned mobilisation and physiotherapy</li> <li>• Community support and helpline</li> </ul>	<b>3</b>

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### Question 4

A 20-year-old patient who satisfies the criteria for brainstem death has been accepted as an organ donor.

- List the main adverse cardiovascular changes associated with brainstem death. (5 marks)
- What are the physiological goals (with values) required to ensure optimisation of this donor? (7 marks)
- Outline the measures and drugs that may be used to achieve these goals. (8 marks)

Answers	Marks for each (max)
<p>a)</p> <ul style="list-style-type: none"> <li>Initially hypertension, tachycardia, SVR (catecholamine storm)</li> </ul> <p>Followed by:</p> <ul style="list-style-type: none"> <li>Hypotension</li> <li>Hypovolaemia</li> <li>Myocardial dysfunction</li> <li>Arrhythmias</li> <li>Pulmonary oedema</li> </ul>	<b>5</b>
<p>b)</p> <ul style="list-style-type: none"> <li>PaO<sub>2</sub> &gt; 10 kPa</li> <li>PaCO<sub>2</sub> 5-6.5 kPa or pH &gt;7.25</li> <li>Mean arterial pressure 60-80 mmHg</li> <li>Urine output 0.5–2 ml/kg/hour</li> <li>Cardiac index &gt;2.2 – 2.5L/min/m<sup>2</sup></li> <li>Central venous pressure 10-12mmHg (&lt;6 if lungs for donation)</li> <li>SVRI 1800-2400 dynes s/cm<sup>5</sup>/m<sup>2</sup></li> <li>Temperature 36-37.5°C (normothermia)</li> <li>Blood glucose 4-10 mmol/l</li> </ul>	<b>7</b>
<p>c)</p> <ul style="list-style-type: none"> <li>Lowest possible FiO<sub>2</sub></li> <li>PEEP 5-10cmH<sub>2</sub>O. / lung protective strategy/ tidal vol &lt;6mls/kg</li> <li>Recruitment manoeuvres as required</li> <li>Correct hypovolaemia with fluid boluses guided by CVP or CO</li> <li>Consider vasopressin 0–2.4 units/hour for CVS support</li> <li>Consider other vasoactive drugs (eg noradrenaline, adrenaline, dopamine)</li> <li>Consider triiodothyronine bolus and infusion if cardiac performance is still suboptimal</li> <li>Insulin infusion for normoglycaemia</li> <li>Manage diabetes insipidus with vasopressin infusion or desmopressin</li> <li>Methylprednisolone</li> <li>Measures such as forced air warmers, fluid warmers and gas humidifiers to maintain normothermia</li> </ul>	<b>8</b>

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### Question 5

- a) Which methods of testing may be used to confirm the adequacy of a spinal (intrathecal) block for elective Caesarean section? (4 marks)
- b) Describe the actions you could take if your spinal block proves inadequate on testing prior to starting surgery for an elective (category 4) Caesarean section. (3 marks)
- c) What are the early symptoms and signs of a spinal block that is ascending too high? (5 marks)
- d) How should you manage a patient who complains of pain during elective Caesarean section under spinal anaesthesia? (8 marks)

Answers	Marks for each (max)
<p>a)</p> <ul style="list-style-type: none"> <li>• Light touch: cotton wool or similar</li> <li>• Temperature: ice/ethyl chloride spray</li> <li>• Pain: pin (such as neurotip) / pinch.</li> <li>• Motor block: profound motor block of lower limbs (Bromage)</li> <li>• Sympathetic: warm dry soles of feet bilaterally with vasodilatation</li> </ul>	<b>4</b>
<p>b)</p> <ul style="list-style-type: none"> <li>• Positioning head down or on side to spread block</li> <li>• If no evidence of any block-repeat same dose spinal</li> <li>• Insert an epidural to allow supplementation of block</li> <li>• Consider GA</li> <li>• Wait longer and assess/ delay surgery</li> </ul>	<b>3</b>
<p>c)</p> <ul style="list-style-type: none"> <li>• Bradycardia</li> <li>• Severe hypotension</li> <li>• Heavy weight on chest</li> <li>• Difficulty in breathing</li> <li>• Tingling in the arms</li> <li>• Weakness in arms and weak hand grip</li> <li>• Feeling of impending doom/restlessness/agitation</li> </ul>	<b>5</b>
<p>d)</p> <ul style="list-style-type: none"> <li>• Establish extent of sensation felt (pain/tugging/discomfort)</li> <li>• Stop surgery/communicate with surgeon</li> <li>• Reassure mother and partner that action will be taken</li> <li>• Prior to delivery               <ul style="list-style-type: none"> <li>○ Entonox / nitrous oxide</li> <li>○ Alfentanil / remifentanil</li> <li>○ Conversion to GA if needed</li> </ul> </li> <li>• After delivery (must specify these are <u>after</u> delivery)               <ul style="list-style-type: none"> <li>○ Longer-acting opioids</li> <li>○ Ketamine boluses</li> <li>○ GA if all measures ineffective. (Can't get mark again)</li> <li>○ LA infiltration</li> </ul> </li> <li>• Record all actions taken and response to each measure</li> <li>• Review and explain post-op.</li> </ul>	<b>8</b>

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### Question 6

You are asked to review a 27-year-old male who is a known epileptic in convulsive status epilepticus.

- a) Define convulsive status epilepticus. (1 mark)
- b) Outline your initial management of this patient including the use of emergency antiepileptic drug therapy. (7 marks)
- c) 60 minutes after your initial management the patient continues in status epilepticus. What would be your further management? (5 marks)
- d) What are the complications associated with refractory convulsive status epilepticus? (7 marks)

Answers	Marks for each (max)
a) <ul style="list-style-type: none"> <li>• A convulsive seizure lasting longer than 5 minutes or Convulsive seizures occurring one after the other with no recovery in between</li> </ul>	<b>1</b>
b) <ul style="list-style-type: none"> <li>• ABC/ High flow oxygen/ I.V. access</li> <li>• Measure blood glucose</li> <li>• Clarify current AED therapy</li> <li>• Lorazepam (intravenous)</li> <li>• Repeat Lorazepam (intravenous)</li> <li>• If seizures continue one of the following –</li> <li>• Phenytoin/ Fosphenytoin</li> <li>• Phenobarbital</li> <li>• Send blood phenytoin levels when appropriate</li> </ul>	<b>7</b>
c) <ul style="list-style-type: none"> <li>• Critical Care Referral</li> <li>• Usually propofol &amp; midazolam infusions</li> <li>• May require thiopentone infusion</li> <li>• EEG monitoring – Suppression of epileptic activity and Burst suppression</li> <li>• CT scan</li> <li>• Manage Airway</li> </ul>	<b>5</b>
d) <ul style="list-style-type: none"> <li>• Excitotoxic CNS injury (nerve cell damage caused by excessive neurotransmitter stimulation)</li> <li>• Hyperthermia</li> <li>• Pulmonary oedema</li> <li>• Arrhythmias &amp; cardiovascular collapse</li> <li>• Metabolic derangements</li> <li>• Acute kidney and liver injury</li> <li>• Rhabdomyolysis</li> <li>• Fractures</li> <li>• Dental / oral tumour</li> </ul>	<b>7</b>