
2019.2

**South Australia
&
Northern Territory
Trial SAQ Exam**

Booklet 2

SAQs 10 – 18

SAQ 10 (18 marks)

A 30-year-old man presents with a skin infection to his left lower leg.

He has no past history other than swelling of his throat with penicillins.

He has a fever and is haemodynamically stable.

During the process of completing your assessment you become concerned about the possibility of necrotising fasciitis.

- a) Aside from fever, complete the following table for six (6) MOST RELEVANT features in his history and examination that would alert you to the possibility of necrotising fasciitis? (6 marks)

History features (3 marks)	Examination features (3 marks)
<ul style="list-style-type: none"> • Rapid progression of symptoms • Severe pain (out of proportion to skin findings). • Systemic symptoms as anorexia, nausea, diarrhoea, dizziness and general malaise, myalgia. 	<ul style="list-style-type: none"> • Crepitus • Skin bullae • Cutaneous anaesthesia • Oedema that extends beyond the visible erythema • Skin discolouration, ecchymosis or necrosis • Cutaneous anaesthesia

The patient becomes hypotensive.

He is moved to a resuscitation bay and an arterial line is inserted.

An arterial blood gas is taken from the arterial line and **is shown in the props booklet.**

b) Complete the table below in regard to explaining the key findings on the ABG. **(6 marks)**

	Finding	Likely Reason
pH	<ul style="list-style-type: none"> Fully compensated/ Normal pH 	<ul style="list-style-type: none"> Dual pathology - Respiratory alkalosis balanced by metabolic acidosis
PCO₂	<ul style="list-style-type: none"> Respiratory alkalosis/Low PCO₂ 	<ul style="list-style-type: none"> Hyperventilation secondary to pain/distress/circulating endotoxin Compensatory response to metabolic acidosis
Anion Gap	<ul style="list-style-type: none"> High anion gap metabolic acidosis 	<ul style="list-style-type: none"> Early sepsis, poor perfusion, lactic acidosis

c) State the three (3) MOST IMPORTANT management priorities along with justified reason or detail. **(6 marks)**

Management Priority	Justification/detail
<ul style="list-style-type: none"> Urgent surgical referral 	<ul style="list-style-type: none"> Surgical debridement for source control
<ul style="list-style-type: none"> Antibiotics 	<ul style="list-style-type: none"> IV Meropenem 1g, Vancomycin 25-30mg/kg and Clindamycin 600mg (Other combinations maybe acceptable eg Gentamicin/Vancomycin/Clindamycin however all combinations will need to ensure widespread cover that includes MRSA, anaerobes and Gram negatives)
<ul style="list-style-type: none"> Analgesia Or Fluid resuscitation 	<ul style="list-style-type: none"> iv morphine 2.5-10mg NS or Hartmanns 30mls/kg then consideration of inotropic support, aim MAP 65

- Note:
 - Urgent surgical referral mandatory answer
 - Note antibiotic regimen has to take into consideration serious penicillin allergy
 - Hyperbaric oxygen and immunoglobulin therapy not acceptable as although these are possible treatments, they are not priorities.

References: Up to Date, Therapeutic Guidelines

Pass mark 4/6, 4/6, 4/6 = 12/18

SAQ 11 (12 marks)

A 32 year old woman who is 34/40 pregnant is being brought in by ambulance after a high speed motor vehicle accident.

- a) Complete the following table with four (4) possible obstetric injuries/complications and two (2) matching clinical or laboratory findings. **(12 marks)**

Obstetric Injury/Complication	Two (2) Clinical/Laboratory Findings
<ul style="list-style-type: none"> Placental abruption 	<ul style="list-style-type: none"> Abdominal pain. Vaginal bleeding. Uterine contractions. Uterine tenderness/tenseness. Expanding fundal height. Evidence of foetal compromise. Maternal instability.
<ul style="list-style-type: none"> Uterine rupture 	<ul style="list-style-type: none"> Loss of palpable uterine contour Palpable foetal parts. Positive FAST scan. Maternal shock. Vaginal bleeding.
<ul style="list-style-type: none"> Premature labour/rupture of membranes 	<ul style="list-style-type: none"> Uterine contractions. Bloody show.
<ul style="list-style-type: none"> Foeto-maternal haemorrhage 	<ul style="list-style-type: none"> Foetal distress on CTG. Positive Kleihauer Betke test.
<ul style="list-style-type: none"> Amniotic fluid embolism 	<ul style="list-style-type: none"> Cardiorespiratory collapse/arrest DIC (increased D-dimer /PT /APTT /FDPs, decreased antithrombin /protein C / platelets /fibrinogen /clotting factors). Foetal distress on CTG.

	<ul style="list-style-type: none">• Seizure.
<ul style="list-style-type: none">• Foetal demise	<ul style="list-style-type: none">• Absent FHR• Absent Foetal Movement

- Pass mark 8/12

SAQ 12 (13 marks)

A 64 year old man has been brought to your tertiary hospital Emergency Department with a history of syncope.

His observations are:

HR 110 /min

RR 28 /min

SaO₂ 93% RA

BP 105/70 mmHg

GCS 15/15

There are no arrhythmias, heart blocks or signs of Acute Coronary Syndrome on his ECG.

a) List five (5) ECG features that would suggest arrhythmia as a cause of his syncope. **(5 marks)**

- Epsilon waves- arrhythmogenic rt ventricle
- Prolonged QT- Torsades
- Short PR/delta waves- WPW
- RSR and ST elevation in v1/V2- Brugada
- Deep Q/T inversion- HOCM
- ECG features of severe hyper or hypokalaemia
- ECG features of severe Na channel blockade

The patient deteriorates and his observations are now:

HR 125 /min (sinus rhythm)
 RR 32 /min
 SaO₂ 93% RA
 BP 70/50 mmHg
 GCS 13/15
 BGL 6.2 mmol/L

- b) Complete the following table for causes of non-arrhythmic cardiogenic shock and provide specific management for each. **(8 marks)**

Cause	Management
ACS	Revascularisation PTCA/+/- Thrombolysis depending on location CAGS
Papillary muscle rupture	Mechanical assistance devices/Inotropes/ Surgery
Tamponade	Drain
Takotsubo	Inotropes/ Levosimendan
Ventricle rupture	Mechanical assistance devices / ECMO/Surgery
B blocker/ca channel OD	High dose Insulin/dextrose
Na channel blocking agents	HCO ₃ / hyperventilation
Acute myocarditis	Supportive/ Mechanical assistance devices Steroids if immune mediated

- Pass mark 4+5= 9/13

SAQ 13 (12 marks)

A 45 year old man (weighing 70kg) is brought into the ED by the ambulance service after he was witnessed to have a generalised seizure. A total of 5mg of intramuscular midazolam was given pre-hospital. It was suspected that he had taken an overdose of his prescription medication.

- a) List four (4) prescription medications under each of the following drug categories, which could cause a seizure as a result of an overdose **(4 marks)**

Drug class	Example of drug which could cause seizure
Analgesics	<ul style="list-style-type: none"> • tramadol, • lignocaine, • propoxyphene, • salicylates
Antimicrobials	<ul style="list-style-type: none"> • isoniazid, • chloroquine, • quinine
Psychiatric medications	<ul style="list-style-type: none"> • bupropion, • citalopram, • lithium, • venlafaxine, • TCA, • antidopaminergic agents
Other medications	<ul style="list-style-type: none"> • hypoglycaemic agents, • lithium, • essential oils, • hydrocarbons, • methylxanthines, p • ropranolol, • baclofen

- b) List three (3) immediate bedside tests you would do to investigate the cause of his seizure, and for each, state your rationale **(6 marks)**

	Bedside test	Rationale
1	<ul style="list-style-type: none"> BSL 	<ul style="list-style-type: none"> hypoglycaemia
2	<ul style="list-style-type: none"> ECG 	<ul style="list-style-type: none"> features of Na-channel blockade, prolonged QT
3	<ul style="list-style-type: none"> Blood Gas 	<ul style="list-style-type: none"> hyponatraemia, may also have other features related to specific agents

- c) The patient proceeds to have two (2) more seizures in the ED despite intravenous midazolam. List two (2) “second-line” agents (with appropriate dose) which could be used to terminate seizures in this situation **(2 marks)**.

- Levetiracetam 1-3.5g IV over 15-60 min
- Valproate 1-3g IV over 5-60 min
- Pyridoxine (vit B6) : 5g or 70mg/kg empiric
- Phenobarbitone : 5-15mg/kg over 15 mins, then 0.5-3mg/kg/hr
- Propofol : requires airway protection
- **No role for phenytoin
- Pass mark 3+5+1= 9/12

SAQ 14 (13 marks)

A 42-year-old male has presented to your metropolitan Emergency Department with syncope. He is pale and tells you he rarely sees a doctor. He has chronic knee pain from a sporting injury.

A Complete Blood Examination (CBE) was performed and the result **is shown in the Prop booklet**.

a) What are the significant findings shown in the CBE? **(2 marks)**

- Severe microcytic anaemia – low haemoglobin, low red blood cells, low packed cell volume
- Acute anaemia, marrow responding – raised reticulocyte count

b) What would be a likely diagnosis to consider in this patient? **(1 mark)**

- Upper gastrointestinal haemorrhage eg bleeding peptic ulcer from NSAID use

The patient requires a blood transfusion of packed red cells.

In order to gain informed consent for the transfusion a number of important complications need to be discussed with this patient.

c) List five (5) potential complications of a packed red blood cell transfusion. **(5 marks)**

- **Haemolytic anaemia, ABO incompatibility**
- **Urticarial or anaphylactic (allergic) reaction**
- **Transfusion related acute lung injury (TRALI)**
- Bacterial infection (Transfusion Transmitted Bacterial Infection – TTBI)
- Iron overload, fluid overload (TACO)
- Hyperkalaemia
- Febrile non-haemolytic reaction
- Viral infection (EBV, HIV, HBV, HCV, other)

The patient is receiving the prescribed blood transfusion. Nursing staff alert you to a sudden deterioration in the patient's condition. Observations reveal a temperature of 38 degrees and a pulse rate of 110; other observations are normal.

You suspect a transfusion reaction.

d) List five (5) immediate actions you would take in this situation. **(5 marks)**

- **Stop transfusion**
- Disconnect bag and tubing and save for analysis
- Maintain IVC- ensure adequate hydration
- Confirm correct product (product ID and patient ID)
- Assess Patient – ie signs of anaphylaxis
- Contact transfusion service- further checks and then follow up testing if required
- Take blood sample for transfusion and for features of haemolysis

- Pass mark 2+1+4+3= 10/13

SAQ 15 (11 marks)

A 75 year old man is brought by ambulance to your rural ED. He has a history of stroke, and consequently lives in a high-level care nursing home. He has been sent to hospital as he has become agitated and pulled out his PEG (gastrostomy) tube.

- a) List two (2) factors that will determine whether you will attempt to re-site the tube, and provide a brief rationale for each. **(4 marks)**

Factor	Rationale
Time since PEG placement	If < 4 weeks, tract may not have matured adequately, and gastric/abdominal wall may have separated. Risk of tube misplacement into peritoneal cavity. Should not be re-sited in ED
Time since PEG removal	Ideally should be replaced ASAP as tract will start closing in 24 hours, perhaps sooner

- Features of peritonitis
- Major bleeding
- Tract closure

You decide to re-site the tube, however a replacement PEG tube is not available in the hospital and there is no specialist gastroenterology or surgical support on site.

- b) What is a suitable alternative? **(1 mark)**

- Foley catheter (large guage)

After having difficulty during the process of re-siting the tube, you are concerned the tube may be malpositioned.

c) What would your next step be and justify? **(2 marks)**

- Imaging study – eg water soluble imaging contrast via tube and CT abdomen

d) Other than inadvertent removal, list four (4) other potential PEG complications that can result in patients presenting to the ED. **(4 marks)**

- Wound infection, ulceration, necrotising fasciitis
- Bleeding
- Leaking around stoma
- Leakage of gastric contents into peritoneal cavity
- Gastric ulceration
- Gastric outlet obstruction
- Pneumoperitoneum
- Ileus/gastroparesis
- PEG blockage
- Aspiration

Pass Mark 2 + 1 + 2 + 3 = 8

SAQ 16 (12 marks)

A 39 year old SCUBA diver presents to your Emergency Department with a rash to his torso after ascending from a dive on the Great Barrier Reef two hours ago.

See image in Props book.

a) State the two (2) most likely differential causes for the rash. **(2 marks)**

- **Cutaneous Decompression illness** (cutis marmorata)
- Dermatitis/Allergic reaction (eg to wet suit)
- 2/2 to pass

b) List six (6) risk factors for a SCUBA diver developing decompression illness. **(6 marks)**

- Increased dive duration
- Multiple dives
- Dehydration
- Strenuous exercise after diving (within 4 hours)
- Cold
- Alternative answers: ascent to altitude soon after diving, smoking, alcohol, obesity,
- 4/6 to pass

The patient develops weakness in his legs and urinary retention. There are concerns that he has Spinal Decompression Illness and the decision is made to retrieve him to the nearest hyperbaric chamber, 300km away.

c) State two (2) advantages and two (2) disadvantages for using an Aeromedical Helicopter to retrieve this patient. **(4 marks)**

- 2/4 to pass
- Advantages:
 - **Speed: fastest way to transfer patient between hospitals**
 - Quick to mobilise,

- can transfer directly between hospitals (if both have heliports),
- less turbulence than fixed wing
- Disadvantages:
 - **Requires ascent to altitude and helicopter cannot be pressurised**
 - Vibration (may worsen DCI),
 - exposure to cold (may worsen DCI),
 - small cabin space (compared to ambulance and fixed wing),
 - may not be able to fly at night and in certain weather conditions.

References: Emergency Medicine Manual by Dunn. Chapters on Problems of Ascent and Inter-Hospital Transfer

SAQ 17 (12 marks)

A 7 year old boy is brought by ambulance to your emergency department from a local primary school; they are accompanied by a teacher.

He has a widespread erythematous rash and difficulty breathing shortly after eating a sandwich from his friend's lunch box that contained peanut butter.

He has no known allergies.

His vital signs are:

HR 140 bpm
SaO₂ 90% on room air, with wheeze, no stridor
RR 42 bpm
BP 75/45 mmHg
GCS 15/15

a) What is the estimated weight for this patient? (Please include your formula) **(2 marks)**

- Expected weight for a 7 year old = $(7 + 4) \times 2 = 22$ kg (APLS)
- $(3 \times \text{age}) + 7 = 28$ kg (new version)
- $4 \times \text{age} = 28$ kg (Resus.me 5-14y/o)

The resuscitation team have moved him to a resuscitation bay and they have applied high-flow oxygen.

- b) What three (3) most important treatments would you prescribe for this patient? Complete the table below with treatments and details. **(6 marks)**

	Treatment	Details (dose, concentration, route)
1	adrenaline	10 microg/kg, 0.01 ml/kg of 1:1000 = 0.22 ml IMI
2	salbutamol	nebuliser 5mg
3	0.9% NaCl	Up to 20ml/kg (440ml) IV bolus

One of the child's parents has arrived and after a period of observation you decide they require referral to an inpatient team.

- c) List four (4) indications for referral for inpatient team admission. **(4 marks)**

- Required >1 dose of adrenaline
- Severe asthma or history of biphasic reactions
- Possible continued allergen absorption
- Patient has difficulty responding to deterioration, no easy access to emergency care
- Presenting to ED in the evening or night
- Parental anxiety
- (Severe idiopathic anaphylaxis)- in this case likely nuts
- (slow response to adrenaline, requirement for inhaled beta agonists, initial hypotension)- are all RFs for biphasic reactions
- Pass mark 2+4+3= 9/12

SAQ 18 (12 marks)

A 2-year-old boy is brought to your emergency department by his mother. She is concerned that he has been vomiting and having diarrhoea for the last 3 days. He has been having 4–5 loose watery stools per day. His mother does not report any blood within the nappies.

His weight is 12 kg.

a) List five (5) indications for doing blood tests on a child with gastroenteritis. **(5 marks)**

- renal disease
- diuretic use
- altered conscious state
- 'doughy' skin (suggesting hypernatraemia)
- home therapy with excessively hypertonic fluids (eg homemade solutions with added salt) or excessively hypotonic solutions (eg prolonged plain water or diluted formula)
- profuse losses
- losses > 24 hours duration
- ileostomy
- septic/toxic child
- hypoglycaemia

b) List four (4) clinical signs that indicate severe dehydration. **(4 marks)**

- Altered conscious state
- Poor skin turgor – greater than 2 second skin fold visible
- Sunken eyes
- Reduced CRT and other signs of shock
- Deep acidotic breathing
- Reduced urine output

The child is assessed as having moderate dehydration (5%). You decide to proceed with oral rehydration.

c) Provide details of the rehydration regime you will use for this child. (3 marks)

- Ondansetron wafer 2 mg if active vomiting
- Oral (or NG) ORS (gastrolyte, hydralyte)- not lemonade or sports drinks
- Small amounts frequently
- Should accept a range of rates for replacement: (slow to rapid)
- Slow: 10-20 mls/kg/hr
- Rapid: 25 mls/kg/hr
- For 12 kg child, rate could be between 120 mls/hr to 300 mls/hr for 4 hours

- Pass mark $4+3+2=9/12$