

FExNet 2026

Collated SAQs: Environmental Emergencies

QUESTION BOOKLET

22 short-answer questions covering the ACEM Fellowship environmental emergency curriculum — Australian envenomation (snake, spider, marine, ciguatera, blue-ringed octopus), Hymenoptera anaphylaxis and massive sting, tick paralysis and mammalian meat allergy, carbon monoxide poisoning, altitude illness (AMS, HACE, HAPE), diving emergencies (DCI, pulmonary barotrauma and AGE, inert gas narcosis and oxygen toxicity), marine animal attack (crocodile, shark), wilderness retrieval. Drowning, hypothermia, heat stroke, hanging, lightning and high-voltage electrical injury are covered in Trauma in Special Circumstances. Stems in detailed prose with abbreviations spelt out.

22 questions • 218 marks

ACEM-aligned format. Sub-questions labelled a) b) c). Mark allocations indicative; references cited in the Answer Booklet. Question and answer indexes are clickable.

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Question 1 | Eastern Brown Snake Envenomation (12 marks)

A 32-year-old man is brought to your regional emergency department by ambulance after being bitten on the right lower leg by a snake while walking through long grass approximately 90 minutes ago. The snake was described as brown. A pressure-immobilisation bandage has been applied from foot to thigh and the leg splinted. On arrival: Glasgow Coma Score 14 (drowsy), heart rate 105 beats per minute, blood pressure 110/65 millimetres of mercury, respiratory rate 22 breaths per minute. Bloods: international normalised ratio >15, activated partial thromboplastin time >200 seconds, fibrinogen <0.2 grams per litre, platelets $80 \times 10^9/L$, D-dimer markedly elevated, creatine kinase 580 U/L, creatinine $110 \mu\text{mol/L}$.

a) Name 4 features of envenomation present in this patient AND state the principal syndrome. (4 marks)

b) Outline 5 priorities of management. (5 marks)

c) Name 3 indications for antivenom in suspected snake envenomation. (3 marks)

Question 2 | Tiger Snake Envenomation with Neurotoxicity (11 marks)

A 45-year-old farmer is brought to your Tasmanian regional emergency department 3 hours after being bitten on the right calf by a tiger snake (*Notechis scutatus*) while clearing brush. A pressure-immobilisation bandage was applied at scene. On arrival: Glasgow Coma Score 13, heart rate 95, blood pressure 105/60, respiratory rate 20, peripheral oxygen saturation 96 percent on room air. He has bilateral ptosis, ophthalmoplegia, dysphagia, and difficulty swallowing his saliva. Forced vital capacity is 1.8 litres (predicted 4.5). Bloods: international normalised ratio 4.5, activated partial thromboplastin time 65 seconds, creatine kinase 12 500 U/L, potassium 5.8 millimoles per litre, creatinine 145, myoglobin in urine.

a) Name 4 features of tiger snake envenomation demonstrated in this patient. (4 marks)

b) Outline 5 management priorities including antivenom and airway considerations. (5 marks)

c) List 2 long-term complications to anticipate. (2 marks)

Question 3 | Snakebite Assessment, Pressure Bandaging and Venom Detection (10 marks)

You are the consultant on duty in a rural emergency department when a paramedic radios that they are transporting a 22-year-old man bitten on the hand by an unknown snake 30 minutes ago. The patient is currently asymptomatic. The paramedic asks for advice on management. The patient is 1 hour from your emergency department.

a) Outline 4 components of the correct pressure-immobilisation bandage technique. (4 marks)

b) Outline 4 priorities for the patient upon ED arrival. (4 marks)

c) List 2 indications for polyvalent antivenom (rather than monovalent). (2 marks)

Question 4 | Funnel-Web Spider Envenomation (10 marks)

A 6-year-old boy is brought to your Sydney emergency department by his parents after being bitten on the right hand by a large black spider in their garage 45 minutes ago. The spider has been brought in a jar and identified as a male Sydney funnel-web spider (*Atrax robustus*). On arrival: distressed and crying, Glasgow Coma Score 14, heart rate 145 beats per minute, blood pressure 145/95 millimetres of mercury, respiratory rate 32, temperature 37.0 °C, profuse salivation, lacrimation, sweating, muscle fasciculations of the trunk, and abdominal pain. A pressure-immobilisation bandage has been applied at home.

a) Name 4 features of severe funnel-web spider envenomation present in this patient. (4 marks)

b) Outline 4 immediate management priorities. (4 marks)

c) Name 2 differential diagnoses for the presentation. (2 marks)

Question 5 | Redback Spider Envenomation (9 marks)

A 35-year-old woman presents to your suburban emergency department 3 hours after being bitten on the buttock by a spider while at an outdoor toilet. She describes intense pain in the bite area which has spread to her abdomen and lower back. On arrival: Glasgow Coma Score 15, heart rate 95 beats per minute, blood pressure 145/85 millimetres of mercury, respiratory rate 18, temperature 37.6 °C, profuse sweating. There is regional lymph node tenderness in the right groin, and an erythematous puncture mark at the bite site.

a) Name 3 features of latrodectism (redback spider envenomation). (3 marks)

b) Outline 4 management priorities — note **recent evidence-based changes** in antivenom usage. (4 marks)

c) List 2 other Australian spider envenomations and 1 distinguishing feature for each. (2 marks)

Question 6 | Box Jellyfish (*Chironex fleckeri*) Envenomation (11 marks)

You are called to the beach as the on-duty emergency physician of a North Queensland regional hospital in February. A 24-year-old man has been pulled from the water with extensive whip-like linear welts wrapped around his torso, legs and right arm following contact with a large box jellyfish (*Chironex fleckeri*) approximately 5 minutes ago. On arrival of paramedics: Glasgow Coma Score 8, heart rate 50 beats per minute, blood pressure 60/40 millimetres of mercury, respiratory rate 8 and irregular, agonal breathing. Tentacles remain attached to skin.

a) Outline 4 immediate pre-hospital / on-scene priorities. (4 marks)

b) Outline 5 ED priorities once the patient arrives. (5 marks)

c) Name 2 differentiating features between box jellyfish and Irukandji envenomation. (2 marks)

Question 7 | Irukandji Syndrome (10 marks)

A 38-year-old man presents to your Cairns emergency department in February 30 minutes after a 'mild sting' while swimming. He now describes severe lower back pain, abdominal pain, muscle cramps, profuse sweating and a sense of impending doom. On arrival: Glasgow Coma Score 15 but very distressed, heart rate 140 beats per minute, blood pressure 220/130 millimetres of mercury, respiratory rate 28, temperature 37.4 °C. The initial sting site is a small (1 cm) erythematous patch on the right shoulder with no obvious tentacles. Bedside echocardiography shows a moderately reduced left ventricular ejection fraction with global hypokinesis.

a) Name 3 features that confirm Irukandji syndrome. (3 marks)

b) Outline 5 management priorities. (5 marks)

c) List 2 differentials for the syndrome. (2 marks)

Question 8 | Bluebottle and Portuguese Man-of-War Sting (8 marks)

A 12-year-old girl is brought to your Sydney emergency department by her parents after a swimming-related sting at the beach 30 minutes ago. She has a 20 cm linear welt across her right thigh with characteristic 'string of beads' appearance, intense pain, and there are clear bluish residual nematocysts still adherent. She is otherwise systemically well: alert, heart rate 95, blood pressure 110/65, respiratory rate 16, afebrile.

a) Name 3 features distinguishing bluebottle (Physalia) sting from box jellyfish. (3 marks)

b) Outline 3 specific management steps. (3 marks)

c) List 2 indications to escalate care. (2 marks)

Question 9 | Stonefish Envenomation (9 marks)

A 28-year-old fisherman is brought to your northern Queensland emergency department 2 hours after stepping on a stonefish (*Synanceia*) in shallow water at low tide. He describes excruciating pain in the right foot which is now markedly swollen with three puncture wounds over the plantar surface. He took paracetamol and applied a cold pack with minimal relief. On arrival: Glasgow Coma Score 15 (distressed), heart rate 110, blood pressure 145/85, respiratory rate 22, temperature 37.0 °C, diaphoretic.

a) Name 3 features of stonefish envenomation. (3 marks)

b) Outline 4 management priorities. (4 marks)

c) List 2 other Indo-Pacific marine envenomations managed with the same heat principle. (2 marks)

Question 10 | Stingray Barb Injury (9 marks)

A 30-year-old man is brought to your coastal emergency department after sustaining a stingray barb injury to the left thigh while spearfishing. There is a 4 centimetre laceration with a visible barb in the wound; the patient describes intense burning pain. On arrival: Glasgow Coma Score 15, heart rate 105, blood pressure 130/75, respiratory rate 18, peripheral oxygen saturation 99 percent. The wound is bleeding briskly.

a) Name 3 features of stingray injury. (3 marks)

b) Outline 4 management priorities. (4 marks)

c) Name 2 high-risk hosts for marine wound infection. (2 marks)

Question 11 | Blue-Ringed Octopus Envenomation (Tetrodotoxin) (10 marks)

A 19-year-old man is brought to your emergency department by paramedics 45 minutes after a presumed octopus bite while playing in a rockpool at low tide. He noticed a small painless puncture wound on his right hand, then 10 minutes later began to feel peri-oral numbness, weakness, and difficulty breathing. On arrival: Glasgow Coma Score 15 but unable to speak or move, heart rate 85 beats per minute, blood pressure 130/80 millimetres of mercury, respiratory rate 8 with shallow effort, peripheral oxygen saturation 89 percent on 6 litres oxygen mask, bilateral fixed dilated pupils, no spontaneous limb movement.

a) Name 4 features of tetrodotoxin envenomation. (4 marks)

b) Outline 4 management priorities. (4 marks)

c) List 2 other causes of fixed dilated pupils with preserved consciousness/paralysis. (2 marks)

Question 12 | Ciguatera Fish Poisoning (9 marks)

A 35-year-old man presents to your tropical regional emergency department 6 hours after a dinner of barramundi caught from a coral reef. He complains of vomiting and diarrhoea, followed by intense peri-oral and limb paraesthesia. He also describes a peculiar sensation of cold objects feeling burning hot to touch ('temperature reversal'). His two dinner companions present with similar symptoms. On arrival: Glasgow Coma Score 15, heart rate 55 beats per minute, blood pressure 95/55 millimetres of mercury, respiratory rate 18, afebrile, with cool peripheries.

a) Name 4 features of ciguatera poisoning. (4 marks)

b) Outline 3 management priorities. (3 marks)

c) Name 2 other seafood toxin syndromes and a distinguishing feature. (2 marks)

**Question 13 | Hymenoptera Anaphylaxis and Massive Sting Envenomation
(10 marks)**

A 45-year-old beekeeper is brought to your rural emergency department by ambulance after disturbing a beehive on his property. He has approximately 80 visible bee stings scattered over his torso and arms. He felt unwell within minutes, with generalised urticaria, dyspnoea and collapse. Paramedics administered intramuscular adrenaline 500 micrograms en route with partial response. On arrival: Glasgow Coma Score 12, heart rate 130 beats per minute, blood pressure 75/45 millimetres of mercury, respiratory rate 32, peripheral oxygen saturation 90 percent on 10 litres oxygen, generalised urticaria, audible wheeze, tongue swelling. He has not previously had bee sting anaphylaxis.

a) State the diagnosis AND name 2 distinguishing features from typical anaphylaxis. (3 marks)

b) Outline 5 management priorities. (5 marks)

c) State 2 indications for venom immunotherapy (desensitisation) referral. (2 marks)

Question 14 | Tick Paralysis and Tick-Borne Mammalian Meat Allergy (10 marks)

A 4-year-old girl is brought to your eastern Australian rural emergency department by her parents with a 3-day history of progressive weakness. She is now unable to walk and is drooling. Her mother noted a small swelling behind the left ear during today's bath. Examination: Glasgow Coma Score 14, heart rate 70 beats per minute, blood pressure 90/50, respiratory rate 28 with shallow effort, peripheral oxygen saturation 94 percent on room air, ptosis, ophthalmoplegia, weak gag, flaccid limb weakness (more proximal than distal), absent reflexes. An engorged adult tick (*Ixodes holocyclus*) is found embedded in the left post-auricular region.

a) Name 3 features of Australian tick paralysis. (3 marks)

b) Outline 4 management priorities including tick removal technique. (4 marks)

c) List 3 tick-borne illnesses other than paralysis in Australia. (3 marks)

Question 15 | Carbon Monoxide Poisoning (11 marks)

A 35-year-old woman is brought to your emergency department by ambulance after being found obtunded in her bathroom adjacent to a malfunctioning gas hot-water system in winter. Her partner, also obtunded, has been taken to another facility. On arrival: Glasgow Coma Score 10, heart rate 110 beats per minute, blood pressure 100/60 millimetres of mercury, respiratory rate 22, peripheral oxygen saturation 99 percent on 6 litres oxygen mask, temperature 36.8 °C. Examination: cherry-red lips, no external trauma, scattered crackles in both lung bases. Arterial blood gas on 100% oxygen: pH 7.31, partial pressure of oxygen 380 millimetres of mercury, partial pressure of carbon dioxide 32, bicarbonate 18, base excess -5, lactate 5.8 millimoles per litre, carboxyhaemoglobin 38 percent.

a) Name 4 features of severe carbon monoxide poisoning. (4 marks)

b) Outline 5 management priorities AND state the indications for hyperbaric oxygen therapy. (5 marks)

c) List 2 reasons HbCO level does not always reflect severity. (2 marks)

**Question 16 | Acute Mountain Sickness and High-Altitude Cerebral Oedema
(10 marks)**

You are the expedition doctor for a 14-day trek to Everest Base Camp. On day 5, after ascending from 3500 metres to 4400 metres, a 42-year-old previously fit male trekker presents to your expedition tent with severe headache, vomiting, and progressive ataxia. Examination: Glasgow Coma Score 13, peripheral oxygen saturation 78 percent on ambient air at altitude, heart rate 110 beats per minute, respiratory rate 30, afebrile, drowsy and confused, marked truncal ataxia, no focal neurological signs. He took no altitude prophylaxis.

a) Name 4 features of acute mountain sickness (AMS) AND state the diagnosis of high-altitude cerebral oedema (HACE). *(4 marks)*

b) Outline 4 specific management steps in this expedition setting. *(4 marks)*

c) Name 2 strategies for prevention of altitude illness on future expeditions. *(2 marks)*

Question 17 | High-Altitude Pulmonary Oedema (10 marks)

A 35-year-old man is brought to your alpine ski resort clinic 36 hours after rapidly ascending to 3200 metres for a ski holiday. He reports progressive dyspnoea, dry cough now productive of pink frothy sputum, and exhaustion on minimal exertion. On arrival: Glasgow Coma Score 15, heart rate 130, blood pressure 100/65, respiratory rate 32, peripheral oxygen saturation 65 percent on room air, temperature 37.2 °C, bilateral coarse crackles on auscultation, cyanosis.

a) Name 3 features that confirm HAPE. (3 marks)

b) Outline 5 specific management priorities. (5 marks)

c) List 2 prophylactic options for known HAPE-susceptible individuals. (2 marks)

Question 18 | Decompression Illness (DCI) in Recreational SCUBA Diver (11 marks)

A 39-year-old recreational SCUBA diver presents to your tropical coastal emergency department with a rash on his torso, headache and joint pains 2 hours after surfacing from a dive. He completed three open-water dives to a maximum depth of 28 metres earlier today, with the longest dive 35 minutes long and the surface interval 45 minutes. He reports he 'skipped' a 5-minute decompression stop on the final dive to assist a panicking dive buddy. On arrival: Glasgow Coma Score 15, heart rate 105, blood pressure 130/75, respiratory rate 22, peripheral oxygen saturation 96 percent on room air. Examination: cutis marmorata over chest and abdomen, paraesthesia and weakness of the right leg, pain in both shoulders.

a) Name 4 features of decompression illness AND classify by type. (4 marks)

b) Outline 5 management priorities. (5 marks)

c) List 2 risk factors for DCI in this patient. (2 marks)

Question 19 | Pulmonary Barotrauma and Arterial Gas Embolism (10 marks)

A 30-year-old male SCUBA diver is brought to your urban emergency department from a local dive boat. He surfaced rapidly from 18 metres after his weight belt accidentally jettisoned. Within 1 minute of surfacing, he developed sudden left hemiparesis, dysarthria and confusion. On arrival 30 minutes later: Glasgow Coma Score 12, heart rate 110, blood pressure 100/60, respiratory rate 24, peripheral oxygen saturation 92 percent on 6 litres oxygen, asymmetric chest movement with reduced air entry left base, subcutaneous emphysema in the neck. CT brain shows multiple small gas-density lesions in the right cerebral hemisphere.

a) Name 4 manifestations of pulmonary barotrauma from rapid uncontrolled ascent. (4 marks)

b) Outline 4 management priorities including definitive treatment. (4 marks)

c) Name 2 differentials for confusion / focal deficit after diving. (2 marks)

Question 20 | Inert Gas Narcosis and Oxygen Toxicity (8 marks)

A 35-year-old technical diver presents to your regional emergency department after a near-incident while diving to 50 metres on air. His buddy reported that he had become confused and euphoric at depth, attempted to remove his regulator, and was guided to the surface by his buddy with a controlled ascent. He has now recovered fully. He requests advice on a planned 60-metre dive next week on technical mixed gas.

- a)** Name 3 diving-related causes of behavioural change or confusion at depth. (3 marks)

- b)** Complete the table for changes in bubble size with altitude or depth (3 items). (3 marks)

- c)** List 2 strategies to reduce risk on planned deep dive. (2 marks)

Question 21 | Marine Animal Attack — Crocodile and Shark Bite (11 marks)

A 28-year-old man is brought by helicopter ambulance from a remote saltwater estuary in Far North Queensland to your tertiary emergency department with a saltwater crocodile (*Crocodylus porosus*) bite to the right lower limb. He was swimming when attacked approximately 90 minutes ago and was pulled from the water by his companions. The right thigh has extensive crush and avulsion injuries with multiple bite punctures, a partial degloving wound, and ongoing bleeding. Tourniquet was applied at scene. On arrival: Glasgow Coma Score 13, heart rate 130, blood pressure 85/55, respiratory rate 26, peripheral oxygen saturation 96 percent on 8 litres oxygen, temperature 35.4 °C.

a) Outline 4 priorities of resuscitation. (4 marks)

b) Outline 4 specific considerations for crocodile (vs shark) attack. (4 marks)

c) Name 3 organisms specifically associated with saltwater crocodile bites in northern Australia. (3 marks)

Question 22 | Remote Wilderness Retrieval and Pre-Hospital Management (9 marks)

You are the duty consultant at a rural emergency department. A satellite phone call is patched through from an expedition group with a 44-year-old man who has sustained a snake bite and partial paralysis on day 4 of a 14-day remote bushwalk. The group is 7 hours' walk from the nearest vehicle access point in a mountainous national park, with helicopter access possible with daylight remaining (3 hours). They have a first-aid kit but no antivenom or ventilation capability.

a) Outline 4 priorities for telephone advice to the expedition leader. (4 marks)

b) Outline 3 retrieval considerations for this patient. (3 marks)

c) List 2 components of an expedition medical kit for snake-bite country. (2 marks)
