"List" = 1-3 words
"State"= short statement/ phrase/ clause

UNIVERSITY HOSPITAL, GEELONG
FELLOWSHIP WRITTEN EXAMINATION
WEEK 29– TRIAL SHORT ANSWER QUESTIONS Suggested answers

PLEASE LET TOM KNOW OF ANY ERRORS/ OTHER OPTIONS FOR ANSWERS

Please do not simply change this document - it is not the master copy !

Question 1 (18 marks)

An 84 year old woman is brought to your emergency department by her daughter, who is her carer. Her daughter is frustrated with her mother because she cannot mobilise today. The triage nurse approaches you with a concern of possible elder abuse.

a. List four (4) behaviours that the carer may display that would support the concern of elder abuse. (4 marks)
- **Stated aggressive verbalisation**
- **Tension/ argument/ antagonism between patient and carer**
- **Signs of undue stress**
- **Inconsistent accounts**
- **Defensive**
- **Disengaged**
- **Failure of carer to allow staff to be alone with patient**
- **Evidence of psychiatric disorder**
- **Evidence of intoxication**

b. List four (4) examination features that would support the concern of elder abuse. (4 marks)
- **Poor sanitation**
- **Signs of local trauma**
- **Unexplained bruise or welts**
- **Unexplained fractures**
- **Untreated physical conditions - eg pressure sores, infections**
- **Restraint marks eg rope marks to wrists**
- **Broken spectacles**
- **Weight loss**
- **Dehydration**
- **Malnutrition**

The patient appears unwell and frail. You make a clinical diagnosis of left lower lobe pneumonia. No past history is available.
Her vital signs: BP 75/60 mmHg HR 140 bpm RR 40 bpm Temp 39.6°C O2 sat 86% on room air

The patient fails to respond to your escalation of treatment. The daughter says she wants "everything done".

c. List five (5) factors that you would consider when discussing this request with the daughter. (5 marks)
- **Pre-stated patient wishes and autonomy**
- **Clarify presence or absence of Advanced Health Directive (or similar document) or any enduring power of attorney**
- **Duty of Care- To identify and treat reversible pathology, if reasonable belief of advantage to life or QOL**
- **Pre-morbid QOL.**
- **Results of CT and other tests**
- **Other stakeholders- other NOK, ED nursing, GP, ICU colleagues**
- **Actual limits of Mx, and their indications. Includes Rx goals and disposition destination.**
- **Timing of actions**
- **Medicolegal, ethical**
- **Personal biases**

The daughter reports that the patient is a registered organ donor and wishes to pursue the possibility of organ donation

d. List five (5) criteria that must be met for the consideration of organ donation. (5 marks)
- **Consent**
- **Permission from the Coroner**
- **Age** *(0- 75)*
- **Brain death** *(irreversible loss of brain function)*
- **Maintained on a ventilator with intact circulation**
- **No PHx of malignancy** *(except 1° brain tumour / minor skin lesions)*
- **No major untreated sepsis** *(Rx sepsis may be considered)*
- **No major blood borne illnesses** *(eg HIV, Hep C)*

Question 2 (13 marks)

A 35 year-old woman driver was involved in a motor vehicle collision. She was wearing a seatbelt, self-extricated herself and was ambulant at the scene. While giving details to the police, she reported neck pain which was not present for the first 10 minutes post collision. She arrives by ambulance in sitting position without spinal immobilisation. A rigid cervical collar is placed at triage. Her main complaint is of moderate severity neck pain.

a. List four (4) features on history or examination that would mandate the need for cervical spine imaging. (4 marks)
   - **High risk mechanism- rollover, high speed** *(> 100 km/ hr)*
   - **Neurological symptoms-** *(paraesthesia in extremities)*
   - **Neurological signs**
   - **Past Hx of neck pathology** *(eg. Sx, injury, disease- RA, Ank spond)*
   - **Altered conscious state** *(↓GCS, confusion, intoxication)*
   - **Associated injuries** *(CHI, distracting injury)*

b. Assuming the absence of all of these features, list three (3) low risk factors of this presentation as stated that allow safe assessment of range of movement of her cervical spine. (3 marks)
   NB: "as stated"- mechanism/ tenderness/ alertness/ intoxication are not stated
   - **Ambulant at the scene**
   - **Delayed onset of neck pain**
   - **Sitting in the ED**

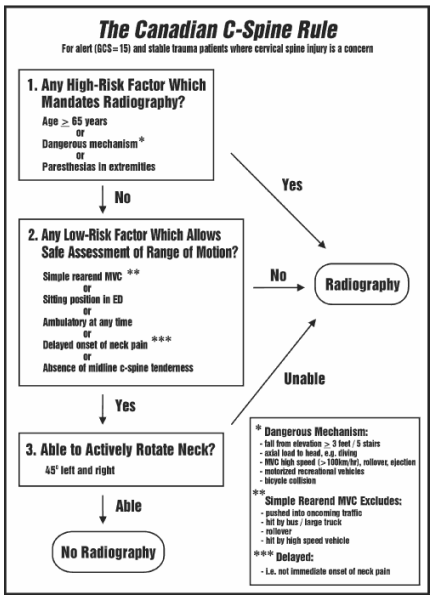


Table 2. NEXUS Criteria For Low Probability Of Injury

1. No midline tenderness
2. No focal neurologic deficit
3. Normal alertness
4. No intoxication
5. No painful distracting injury

c. A decision is made to progress to imaging. State one (1) important pro and one important con for the imaging options below. (6 marks)

NB: Use a clinically relevant pro/con that answers the question- why would we choose/ not choose a particular test? Not Cost/ ease/ easy to interpret

Imaging option	Pros	Cons
Plain xray series	• **Identifies most major abnormalities** • **Likely to get adequate images in young patient** • **Can be used in combination with clinical examination to safely clear C-spine** • **Can be performed in trauma bay** • **Less radiation that CT (but still significant radiation)**	• **May miss subtle injuries** • **Films may be inadequate** • **Images may be difficult to interpret** • **If films normal but inadequate ROM then CT or MRII required**
CT C Spine	• **Sensitive for bony injury + accurate** • **Images other (non bony) structures in neck** • **Radiation equivalence to C-spine series if low dose protocol used** • **Difficult body habitus** • **Pre-existing C-spine pathology**	• **Radiation to thyroid/ breast/ pregnancy** • **Does not exclude certain pathology e.g. ligamentous injury, disc pathology, epidural haematoma, or cord contusion** • **Transfer generally required from ED** • **Requires specialist interpretation**
MRI C spine	• **Accurately identifies acute spinal cord pathology requiring intervention - disc lesion/ epidural haematoma + other pathology e.g. cord contusion, ligamentous injury.** • **No radiation**	• **Less sensitive at delineating bony injuries** • **Time (duration)** • **Patient factors. E.g. Claustrophobia.** • **Contraindications related to metal FB etc.** • **Requires specialist interpretation** • **Availability (other answers better)**

Question 3 (13 marks)

A 16 year old girl presents to the emergency department with lower abdominal discomfort and per vaginal bleeding of 24 hour duration. She thinks that she may be pregnant on the basis of one missed period (LNMP 6 weeks ago).

a. Complete the table below, demonstrating, in list format, your understanding of the role of a urine pregnancy test in this patient. (4 marks)

Significance of a positive result	• **Likely true positive** • **Low false +ve rate** • **Will need quantitative to assess gestation & for F/U**
Significance of a negative result	• **Rules out pregnancy in 97%** • **LNMP 6 weeks- expect +ve result if pregnant** • **False -ve:** - **Poorly performed/ not waited long enough** - **Dilute urine** - **Strips out of date** - **Strip error**

Her urinary pregnancy test is positive.

b. List two (2) circumstances in which a vaginal speculum examination would be indicated for this patient. (2 marks)
   - **Heavy bleeding > NMP** *(suggesting Cx products)*
   - **Trauma**
   - **Rape/ unconsented penetration for forensic examination**
   - **Known vaginal pathology**
   - **Remote/ no O+G service on site**

A transvaginal ultrasound shows a normal 6 week intrauterine pregnancy. The patient states that she does not wish to continue her pregnancy.

c. List three (3) factors on history that you would seek from the patient with respect to this statement. (3 marks)
   - A**ssessment of competency**
   - **Reasoning**
   - **Understanding**
   - **Social supports**
   - **? independent/ dependant**
   - **Prior STOP/ pregnancies**
   - **Comorbidities including significant medical or psychiatric**

The patient's parents arrive and demand to know what is wrong with her.

d. List four (4) steps that you would take in response to this request. (4 marks)
   - **Reassure parents**
   - **Assess competency**
   - **Respect privacy if competent**
   - **Explain to pt importance of telling parents**
   - **Encourage pt to disclose**
   - **Disclose- if patient is not competent**
   - **Bear in mind the possibility of sexual assault**

Question 4 (12 marks)

An 18 month boy presents with 24 hours of vomiting and bloody diarrhoea.

a. Other than Haemolytic uraemic syndrome, list four (4) likely causes for this presentation. (4 marks)

NB: Anal causes inc. fissure less likely given associated vomiting- need to think of others

- **Infective Gastro (eg Salmonella)**
- **Cow's milk/ soy protein-induced colitis**
- **Meckel's diverticulitis** *(needs to be itis, rather than just ..um)*
- **Intussusception**
- **Henoch-Schönlein purpure**
- **Iron ingestion**
- **Volvulus**
- **Haemophilia**
- **Inflammatory bowel disease**

b. List four (4) features on examination that would support the diagnosis of haemolytic uraemic syndrome. (4 marks)

- **Pallor**
- **Haematuria**
- **Hypertension** *(50%)*
- **Encephalopathy**
- **Seizures** *(40%)*
- **Hepatosplenomegaly**
- **Peritoneal signs**
- **Ileus**
- **Associated pneumococcal disease** *(as 1° problem with 2° HUS)*

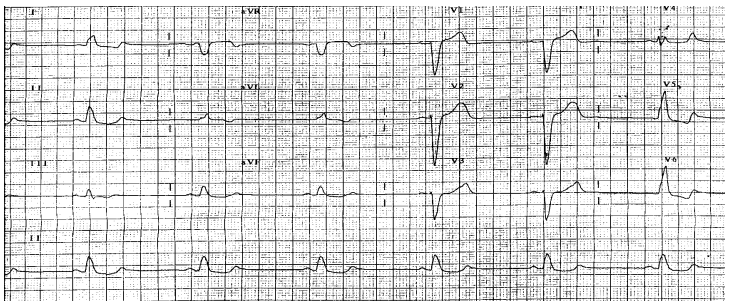
c. List four (4) laboratory findings that are consistent with haemolytic uraemic syndrome. (4 marks)

- **AKI- Urea and Creatinine elevated**
- **Anaemia**
- **Elevated reticulocyte count**
- **Decreased haptoglobin level**
- **Haemolysis (fragmented blood cells) on blood film**
- **WBCs: Left shift**
- **Positive Coombs Test**
- **Thrombocytopaenia**
- **FDPs elevated but APPT, PT normal**
- **Bilirubin, ALT/AST/LDH elevated**
- **Urine micro - haematuria/proteinuria/ dysmorphic RBCs/ casts**

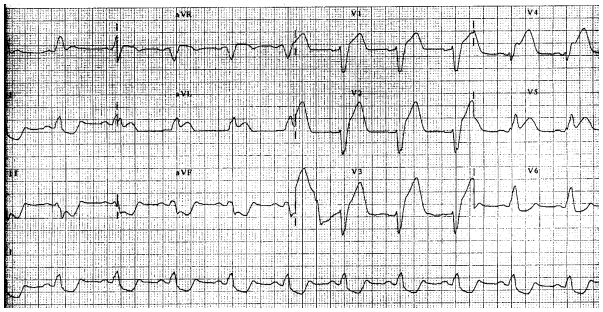
Question 5 (12 marks)

A 64 year-old man presents to your Emergency Department with chest pain.

ECG1 Previous resting ECG

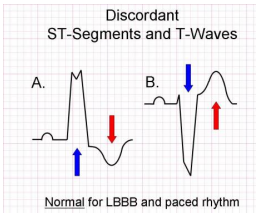


ECG2 Current ECG with pain.



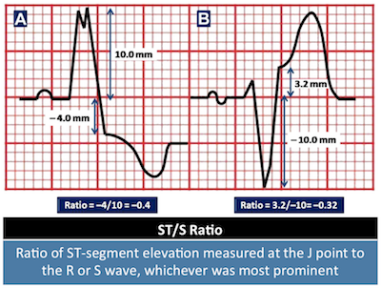
a. State five (5) abnormal findings in ECG 1. (5 marks)

- **Sinus brady- rate ~ 40**
- **Poor R wave progression**
- **LBBB**
- **Biphasic T waves I, aVL 5-6**
- **T waves inverted aVL**



b. State two (2) different abnormal findings ECG 2. (2 marks)

- **STE I 1mm, aVL 2 mm, V2-V4 4mm V5 1 mm**
- **STE I, aVL V5 concordant to QRS**
- **STE V2-V4 > 25% of preceding S wave**
- **STD II, III, aVF, V6**
- **STD III, aVf > 1 mm concordant to QRS vector**



c. State the significance of the changes in ECG 2, when compared to ECG 1. Include reference to evidence based criteria in your answer. Include five (5) statements in your answer. (5 marks)

- **Changes suggest acute ischaemia- STEMI**
- **Given chest pain, is an indication for urgent Cardiology RV/ reperfusion therapy**
- **Concordant STE 1 mm in I, V5, aVL - +ve**
- **Discordant STE > 5mm in V2, V3, V4**
- **Concordant STD 2mm in III, aVF**
- **Modified Sgarbossa Criteria:**

  ≥ 1 lead with ≥1 mm of concordant ST elevation
  ≥ 1 lead of V1-V3 with ≥ 1 mm of concordant ST depression
  ≥ 1 lead anywhere with ≥ 1 mm STE and proportionally excessive discordant STE, as defined by ≥ 25% of the depth of the preceding S-wave

Background:

- *In patients with left bundle branch block (LBBB) or ventricular paced rhythm, infarct diagnosis based on the ECG is difficult*
- *The baseline ST segments and T waves tend to be shifted in a discordant direction ("appropriate discordance"), which can mask or mimic acute myocardial infarction.*
- *However, serial ECGs may show dynamic ST segment changes during ischemia.*
- *A new LBBB is* always *pathological and can be a sign of myocardial infarction.*

Modified Sgarbossa criteria have been created to improve diagnostic accuracy of the Original Sgarbossa criteria. The most important change is the modification of the rule for excessive discordance. The use of a 5 mm cutoff for excessive discordance was arbitrary and non-specific — for example, patients with LBBB and large voltages will commonly have ST deviations > 5 mm in the absence of ischaemia. The modified rule is positive for STEMI if there is discordant ST elevation with amplitude > 25% of the depth of the preceding S-wave

Original Sgarbossa criteria (GUSTO-1) 1996 NEJM

- *131 of 26,003 pt with MI*

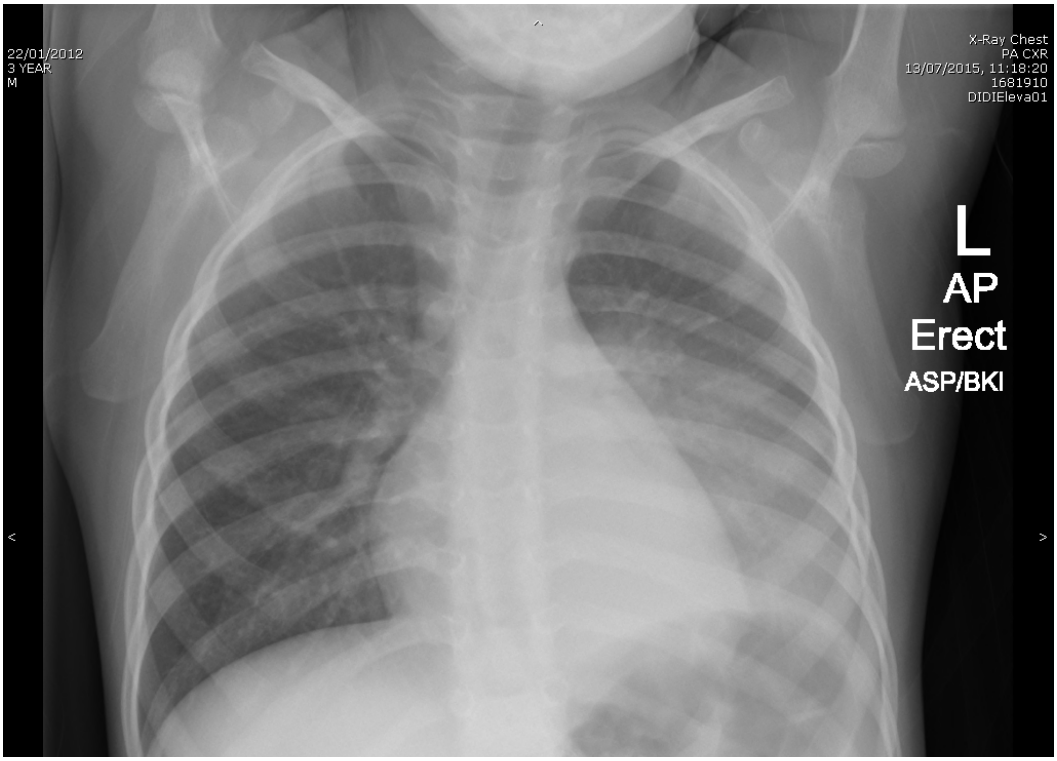
  STE of ≥ 1mm in the same direction of QRS (concordant)- score 5
  STD of ≥ 1mm in any lead from V1-3- score 3
  STE of ≥ 5mm discordant with QRS (ie with QS or rS)- score 2
  score ≥ 3 gives specificity of 90% but poor sensitivity ∴ presence highly likely MI, absence has little value

Follow link below for more explanation:

http://rebelem.com/modified-sgarbossa-criteria-ready-primetime/

Question 6 (12 marks)

A 3 year old male presents with shortness of breath.



a. What is the diagnosis? (1 mark)
   - **LLL Pneumonia**

b. List five (5) radiological features that support this diagnosis. (5 marks)
   - **Patchy changes L base**
   - **↓ volume L hemithorax**
   - **↓ rib spacing on L**
   - **L hemidiaphragm not clear**
   - **Scoliosis to R**

c. List six (6) factors that you would consider when determining disposition for this patient. (6 marks)
   - **Oxygenation (sats > 92%) MANDATORY**
   - **Work of breathing MANDATORY**
   - **Hydration status**
   - **Conscious state**
   - **Previous poor response to oral antibiotics**
   - **Comorbidities- asp asthma/ CF**
   - **Prematurity**
   - **Distance from hospital**
   - **Parental understanding/ coping strategies**

Dr Tom Reade (Staff Specialist, University Hospital, Geelong Emergency Department)
Email: tomre@barwonhealth.org.au
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Question 7 (12 marks)

A 23 year old man with a decreased level of consciousness is being assessed in your ED. His arterial blood gas results:

			Reference Range
FIO_2	0.3		
pH	6.9		(7.35-7.45)
pCO_2	10	mmHg	(37-45)
pO_2	147	mmHg	(80-95)
Bicarbonate	2	mmol/L	(22-28)
Base excess	-30		(-3 - +3)
O_2 saturation	98	%	(> 95)
Lactate	7.1	mmol/L	(< 1.3)
Na^+	140	mmol/L	(134-146)
K^+	6.0	mmol/L	(3.4-5.0)
Cl^-	105	mmol/L	(98-106)
Creatinine	0.1	mmol/L	(0.06–0.12)
Urea	4.8	mmol/L	(3.0-8.0)
Glucose	5.2	mmol/L	(3.5-5.5)
Osmolality	360	mOsm/L	(275–295)

a. Provide four (4) calculations to help you to interpret these results. (4 marks)
   - **Derived value 1:**
     - **AG= Na - (Cl- HCO3) = 140 - (105 + 2) = 33 = high**
   - **Derived value 2:**
     - **Delta Gap**= *Measured anion gap – Normal anion gap* = *(AG – 12)*= **33-12 = 21 = 1**
       Normal [HCO3-] – Measured [HCO3-] *(24 - [HCO3-])* **24-2 22**
       = pure anion gap acidosis
   - **Derived value 3:**
     - **Calculated Osmolarity =** *(2 x [Na+]) + [glucose] + [urea]* **= 280 + 5 + 5= 290**
   - **Derived value 4:**
     - **Osmolar gap =** *Osmolality (measured) - Osmolality (calculated)* **= 360 - 290= 70 = high osmolar gap** *(Normal < 10)*

b. Using this scenario and the derived values, list three (3) likely potential causes for the abnormal results. (3 marks)
   - **Alcoholic ketoacidosis**
   - **Methanol OD**
   - **Ethylene glycol OD**

c. List two (2) pros and three (3) cons for the use of bicarbonate in this patient. (5 marks)
   Pros:
   - **Severe acidosis may cause cardiac dysrhythmias**
   - **Severe acidosis decreases cardiac contractility**

   Cons:
   - **No evidence base to support- conflicting studies of risk vs benefit**
   - **Paridoxically increases CNS acidosis**
   - **Leads to hyypernatraemia**
   - **Leads to hypokalaemia**
   - **Shifts the O_2 dissociation curve to the left- causes relative tissue hypoxia**
   - **Hyperosmolality**

Question 8 (13 marks)

a. Complete the table below, by stating one (1) expected dose-dependent clinical effect for each dose range of Venlafaxine overdose. State also one (1) management of venlafaxine overdose for each dose range up until > 7 grams- for this dose range state three (3) management steps. (10 marks)

Dose	Clinical effects	Management indicated
< 1.5 g	• **Nil** • **Dysphoria** • **Mydriasis** • **Sweating** • **Tremor** • **Clonus** • **Tachycardia** • **HT** *any of above suggest seizure imminent*	• **Nil or benzos**
> 3 g	• **Seizure risk > 30%**	• **Observe** • **Bz if signs of pre-seizure**
> 4.5 g	• **Seizure risk approaches 100%** • **Hypotension** • **QRS or QT prolongation**	• **BZ**
> 7 g	• **Hypotension** • **Hyperthermia** • **Cardiac dysthrythmias**	• **Early ETT** • **Hyperventilation** • **$NaHCO_3$** • **IV fluids** • **BZ**

b. List three (3) criteria that must be met in a patient with a venlafaxine overdose for the use of activated charcoal. (3 marks)

- **> 4.5g**
- **< 2/24**
- **Alert**
- **if > 7g must be after ETT**

Question 9 (18 marks)

You have just commenced your morning shift in the emergency department. A nurse asks you to come and see a 50 year old male patient at the request of one of the night registrars who is having difficulty placing a central venous line. The patient requires intravenous access for severe cellulitis that has been resistant to oral antibiotics and the registrar was unable to obtain peripheral IV access. On your arrival, the registrar notes that he was only partially able to insert a right internal jugular catheter and has "lost" the wire in the patient. A chest xray that he has performed confirms that the guide-wire is in the SVC and right atrium.

a. List the five (5) elements of open disclosure. (5 marks)
   - **An apology or expression of regret**
   - **A factual explanation of what happened**
   - **An opportunity for the patient/their family to relate their experience**
   - **A discussion of the potential consequences of the adverse event**
   - **An explanation of the steps being taken to manage the adverse event and prevent recurrences**

b. List six (6) KEY management steps for this situation. (6 marks)
   - **Close monitoring**
   - **Place peripheral IV access utilising ultrasound**
   - **Arrange removal of the catheter- vascular/ cardiothoracic/ interventional radiology**
   - **Admission to a monitored area**
   - **Support the trainee- seek information, suggest notifying medical defence**
   - **Clinical debrief- at the time and distant time to review**
   - **Incident report**
   - **Thorough documentation**
   - **Notify hospital legal/ risk management**
   - **(Review ED procedures- supervision, credentialing)**

c. List three (3) steps that could be used to determine that a registrar is safe to perform a central venous line unsupervised. (3 marks)

(NB: not simply "see 1, do 1, teach 1")

Competency package competed- should include:

- **Received appropriate training- able to discuss all aspects of the procedure**
- **Observed the procedure- a number of times, including instruction**
- **Performed the procedure supervised a number of times- demonstrated appropriate competence, actual number depends on prowess, confidence, showing appropriate care**

d. List four (4) limitations that could be placed on the initial performance of unsupervised insertion of a central venous line. (4 marks)
   - **Competence package completed- the above criteria met**
   - **In consultation- indirectly supervised**
   - **Selected patients with correct indication**
   - **Not likely to be difficult**
   - **Assistance available**