COLLEGE OF INTENSIVE CARE MEDICINE
OF AUSTRALIA AND NEW ZEALAND

SECOND PART EXAMINATION

EXAM REPORT

MARCH / MAY 2023

This report is prepared to provide candidates, tutors, and Supervisors of Training with information regarding the assessment of candidates' performance in the CICM Second Part Examination. This report is for use as an educational resource and includes a guide as to expected content of the answers for the written paper. Trainees/SIMGs should discuss the report with their supervisors and educators so that they may prepare appropriately for future examinations. Trainees/SIMGs should not rely solely on writing practice answers to previous exam questions for exam preparation, and first establish a strong knowledge base from clinical learning and studying relevant texts, journals, and on-line resources.

The exam comprises a written section and an oral section. The written exam consists of two 2.5hr papers of 15 short answer questions each. The pass mark for the written section is derived by the Angoff method and for this sitting was set at 49.8%. The oral exam consists of eight interactive vivas and two separate clinical hot cases. The vivas and clinicals were completed in person over one week in Sydney.

The tables below provide an overall statistical analysis as well as information regarding performance in the individual sections. A comparison with data from the four previous exams is provided.

In all sections of the exam the candidate must demonstrate performance consistent with that of a trainee who is ready to enter the transition year of the CICM training program, by demonstrating they have the ability for safe, effective, independent practice as an Intensivist. Candidates who are not at this level are encouraged to defer their attempt at the exam.

Overall Performance	2023.1	2022.2	2022.1	2021.2	2021.1	2020.2
Presenting for written (Including SIMG)	66	52	38	64	54	45
Carrying a pass or exempted from a previous attempt	8	29	24	26	25	2
SIMG Exempt	2	3	4	4	0	0
Total number presenting (written + carry + SIMG)	74	81	62	90	79	47
Invited to orals (passed written section)	24	23	21	46	40	29
Total number invited to oral section	32	52	45	70	66	31

Analysis of Performance in Individual Sections	2023.1	2022.2	2022.1	2021.2	2021.1
Successful in the written section	24/66 36%	23/52 44%	21/38 55%	46/64 72%	40/54 74%
Successful in the Hot case section	18/32 56%	27/51 53%	21/45 47%	37/70 53%	35/66 53%
Successful in both Hot cases	13/32 41%	16/51 31%	14/45 31%	25/70 36%	22/66 33%
Successful in the Viva section	27/32 84%	44/51 86%	40/45 88%	56/70 80%	40/66 61%

Sectional Pass Rates	2023.1		2022.2		2022.1		2021.2			2021.1		
Hot cases	**Pass rate**	**Highest individual mark**	**Pass rate**	**Highest individual mark**	**Pass rate**	**Highest individual mark**	**Pass rate**		**Highest individual mark**	**Pass rate**		**Highest individual mark**
Hot case 1	56%	85%	49%	85%	51%	82%	67%		80%	58%		85%
Hot case 2	56%	90%	59%	90%	47%	85%	49%		90%	44%		85%
VIVAs	**Day 1**	**Day 2**	**Week 1**		**Week 1**	**Week 2**	**Day 1**	**Day 2**	**Day 3**	**Day 1**	**Day 2**	**Day 3**
Viva 1	56% / 65%	63% / 80%	84% / 80%		100% / 82%	74% / 78%	79% / 90%	100% / 86%	74% / 80%	80% / 89%	91% / 90%	78% / 82%
Viva 2	94% / 80%	88% / 86%	65% / 83%		59% / 70%	78% / 84%	58% / 66%	83% / 76%	65% / 73%	71% / 73%	775 / 68%	48% / 83%
Viva 3	75% / 83%	63% / 62%	69% / 74%		55% / 66%	74% / 70%	46% / 72%	65% / 71%	57% / 75%	33% / 73%	45% / 80%	30% / 57%
Viva 4	81% / 78%	56% / 74%	59% / 75%		45% / 72%	26% / 57%	71% / 77%	100% / 79%	74% / 79%	62% / 71%	41% / 60%	61% / 63%
Viva 5	44% / 74%	81% / 70%	84% / 81%		68% / 78%	87% / 90%	54% / 66%	43% / 78%	22% / 70%	67% / 64%	23% / 66%	13% / 64%
Procedure Viva 6	63% / 64%	63% / 64%	76% / 82%		95% / 95%	87% / 94%	67% / 83%	96% / 96%	61% / 94%	62% / 80%	64% / 78%	83% / 73%
Radiology Viva 7	75% / 80%	88% / 75%	92% / 90%		55% / 55%	61% / 71%	42% / 60%	17% / 60%	57% / 69%	52% / 69%	32% / 60%	17% / 56%
Communication Viva 8	44% / 88%	75% / 75%	63% / 90%		59% / 92%	65% / 90%	58% / 90%	48% / 90%	48% / 85%	43% / 88%	68% / 78%	74% / 95%

[#]The pass rate and highest individual mark percentages for the viva section are included in the table for each day. For example, viva 1 on Day 1 in 2023.1, the pass rate was 56% and the highest individual mark was 65%.

Oral Section Pass Rates	2023.1	2022.2	2022.1	2021.2	2021.1	2020.2
Candidates who passed in written section and passed the overall exam	17/24	20/52	12/38	27/46	24/40	14/29
	71%	**38%**	**32%**	**59%**	**60%**	**48%**
All candidates invited to oral section and passed the overall exam (written + carry + SIMG)	23/32	36/51	29/45	41/70	32/66	16/31
	72%	**71%**	**64%**	**59%**	**48%**	**52%**
Overall Pass Rate	23/74	36/79	29/62	41/90	32/79	16/47
	31%	**46%**	**47%**	**45%**	**40%**	**34%**

EXAMINERS' COMMENTS

Written Paper

The pass rate for the written section was 36%. Candidates who failed questions did so for one or more of the following reasons:

- Insufficient knowledge of the topic in question
- Insufficient detail and/or depth of the answer
- Poorly structured answer
- Inadequate reference to supportive evidence where relevant
- Failure to answer the question as asked
- Omission of all or part of the question

Candidates that failed questions most often gave insufficiently detailed answers that were not at the level expected of a transitional fellow. Candidates often gave generic "proforma" answers that did not deal with the specific issues in the question.

Candidates are advised to read the questions carefully and thoroughly and ensure they answer the specific question asked and address all parts of each question. Examiners commented that candidates had not appeared to consider the mark distribution in some multi part questions, spending too little time on the more important sections. Candidates are reminded to make sure their writing is legible and to avoid using non-standard abbreviations. Candidates are also reminded that professional conduct is assessed throughout the exam process and that inappropriate comments written on the answer paper are not acceptable.

Candidates are strongly encouraged to consider feedback and advice from SOTs and educational advisors when considering the appropriate time for them to attempt the part 2 examination.

SECOND PART WRITTEN EXAMINATION

(A) Write your answers in the blue books provided. Questions should be answered in groups of **TWO per book only**, except for QUESTION 15 which must be answered in a separate booklet:

(B) Start each answer on a **new page** and indicate the **question number**. It is not necessary to rewrite the question in your answer book.

(C) You should aim to answer each question in **ten** minutes.

(D) The questions are worth **equal** marks.

(E) Record your **candidate number** and each **question number** on the cover of each book and hand in all books.

GLOSSARY OF TERMS

Critically evaluate:	Evaluate the evidence available relating to a topic.
Outline:	Provide a summary of the important points.
List:	Provide a list.
Compare and contrast:	Provide a description of similarities and differences. You may tabulate your answer.
Assessment:	Generic term that implies determining an underlying diagnosis, encompassing; history, clinical examination, and relevant investigations.
Management:	Generic term that implies determining an overall management plan, encompassing; resuscitation, definitive treatment, initial and ongoing monitoring with supportive treatment.
Discuss:	Explain the underlying key principles. Where appropriate, this may include controversies and/or advantages and disadvantages.
Explain:	Make plain, interpret, account for.

NOTE

Where laboratory values are provided, abnormal values are marked with an asterisk (*****).

Please note that in this report all images from the SAQs have been removed.

Question 1

Discuss the assessment and initial management (first hour) of an intubated patient admitted to the ICU with cardiogenic shock, after percutaneous coronary intervention for acute coronary syndrome due to a proximal LAD lesion.

Your answer should include but not be limited to the following headings: potential likely causes, suggested diagnostic approach, key elements of the management of likely causes.

(100% marks)

Aim: To allow the candidate to demonstrate familiarity with initial ICU management of cardiogenic shock.

Key sources include: Paper 2019.1 Q1, CanMEDS Medical Expert.

Discussion: This is an exploration of cardiogenic shock post ACS. This SAQ is a repeat, almost identical in content to the 2019 SAQ.

Candidates did well if they addressed the aspects asked in the question and answers focused specifically on the details given.

The expert answer detailed the most likely and relevant causes of shock post PCI for an LAD lesion, with management in the first hour specifically addressing these causes. Elements of management contained in the expert pass include but are not limited to the following:

- Resuscitation details including suggested vasoactive therapies with rationale,
- Therapies targeting impaired left ventricular function including potential mechanical support,
- Strategies to rule in/rule out the underlying causes, for example tamponade and other confounders such as electrical, valvular and stent complications.

Candidates are advised to place themselves in the clinical context outlined *and describe what they would do,* and this would improve their answers.

Candidates who were generic in their answers and who ignored the clinical stem did less well. For example, many candidates answered with a broad differential of all types of shock. Distributive and neurogenic shock is far less likely in the scenario given. The role of PEEP in cardiogenic shock was generally poorly explained and understood. Answers discussing the assessment and initial management should contain elements of prioritization. For example, a bullet point discussion on balloon pumps and the role of emergency CABG would gain more marks than noting the placement of central access and an arterial line.

Maximum Score	8.250
Percentage scoring >5/10	66.7%

Question 2

Compare and contrast central and nephrogenic diabetes insipidus.

Please tabulate your answer under the following headings: definition, etiology, clinical features, investigations, and specific management.

(100% marks)

Aim: To explore the clinical entities of Diabetes Insipidus.

Key sources include: Paper 2015.1 Q29, CanMEDS Medical Expert.

Discussion: This question is similar in content to the previously published SAQ. Candidates did well if they were able to demonstrate the pathophysiology particularly in nephrogenic DI.

There was a knowledge gap for many candidates. Management of sodium issues, the requirement for *paired* serum and urine samples and a discussion of correction strategies of water/sodium balance were contained in the better answers.

Generic answers that did not address the headings asked or omitted specific details of the investigations and rationale were unsuccessful. To improve the answers, familiarity with the Glossary of terms using *compare and contrast* to state how the aetiology and clinical features are different between the two pathologies.

Maximum Score	8.000
Percentage scoring >5/10	51.5%

Question 3

Discuss airway pressure release ventilation (APRV).

Your answer should include but not be limited to the following headings: physiological rationale, potential advantages, and disadvantages.

(100% marks)

Aim: To examine the candidate's knowledge of a ventilation mode in current ICU practice.

Key sources include: Published ventilation strategy, CanMEDS Medical Expert.

Discussion: This mode of ventilation is more common since the advent of Covid19 and is mentioned more frequently in the current ICU literature. Most candidates had a good understanding of APRV and demonstrated competency under the headings stipulated. Some candidates answers were excellent and included diagrams and pressure time graphs. These candidates should be commended. The use of graphs and diagrams is a useful t way to clearly display key knowledge concepts and is encouraged.

The less successful answers confused APRV with pressure regulated volume control or were unclear in their attempts to explain the concepts, for example 'pressure release'. The instruction to include information "not limited to the following headings" was ignored by some candidates which limited the opportunity to allocate marks. Additional headings used by candidates included - 'ventilation settings', 'indications for use', or 'statement of my practice'.

Maximum Score	7.333
Percentage scoring >5/10	63.6%

Question 4

There has been a complaint made by the family of an Indigenous patient, that the behaviors of staff members in your intensive care unit were culturally unsafe and inappropriate, when they visited their relative in the ICU.

The family has shared their concerns in writing to the unit.

As a specialist in the unit how would you address the experience shared by the family?
You must answer this question from the perspective of your most familiar CICM place of practice (e.g., Australia OR Aotearoa New Zealand). Candidates sitting from outside of Australia may answer from the perspective of EITHER Australian OR Aotearoa New Zealand clinical practice.

(70% of marks for complaint resolution process)
(30% for cultural awareness content)

Aim: To explore the theory and process of complaint resolution, a key skill in ICU leadership. Specifically in relation to written complaints and cultural safety.

Key sources include: IC 20- CICM document**,** Paper 2022.2 Q22. CanMEDS Communicator.

Discussion: Complaint resolution is a repeat topic from last paper 2022.2. and comprised most of the marks. A high level of detail in the complaint resolution process was expected given its importance and its recency in the previous paper. Candidates gained more marks if they addressed concerns AND provided appropriate sensitive follow up in a quality and safety structural format. These candidates did better than candidates who diffused the situation only, without closing the review process in minimal or absent detail.

A list of statements without structure or prioritisation did not address the question as well as a prioritised step wise outline of appropriate investigations and resolution. Some answers escalated the complaint inappropriately suggesting lawyers, police, and hospital administration involvement. The better answers included appropriate referrals through formal or informal channels of resolution and identified the key drivers of change for improvement within the department. The expert answers concluded with methods to monitor and maintain sustainable change for future best practice in this area.

Cultural safety 30% marks – The importance of health equity has been an important topic in health education for many years. No candidate failed this question on cultural safety content. Some candidates went into great depth about specific care and sensitivity to patients with diverse cultural backgrounds they bring to their practice. They were allocated expert pass marks accordingly and are to be commended.

Maximum Score	7.333
Percentage scoring >5/10	63.6%

Question 5

Describe a tiered strategy for the management of raised intracranial pressure in traumatic brain injury, including when each treatment should be considered.

(100% marks)

Aim: To outline the process of management of raised ICP.

Key sources include: Paper 2015.1 q12, BTF guidelines. CanMEDS Medical Expert.

Discussion: This is a repeat SAQ with an extension asking the candidate to nominate a tiered strategy and give an opinion on timing and implementation of each strategy for control of ICP.

Most candidates had the basics of knowledge. Those candidates who did well were well organised, familiar with the guidelines for a tiered approach and provided specifics around timing and ICP levels for intervention and progression of interventions. Details for therapies such as osmotherapy targets and temperature targets were also a component of the better answers.

The vast majority did well, and these candidates should be commended.

Maximum Score	8.500
Percentage scoring >5/10	86.4%

Question 6

You have admitted a 35-year-old patient to your ICU, who presented complaining of shortness of breath, mild headache, lower limb swelling, and passing dark urine.

Initial vital signs are - Temperature 36.7ºC, non-invasive BP 200/110mmHg, respiratory rate 28bpm, heart rate 145 bpm, SpO_2 92% on 6l/min oxygen via a Hudson mask.

Clinical examination shows peripheral oedema on lower limb examination.

Dipstick of urine reveals 3+ for blood and protein, Serum creatinine is 550 mmol/L (45-90) and Serum Urea is 23 mmol/L (3.0-8.0).

a. **List <u>six</u> differential diagnosis for this presentation. (20% marks)**

b. **Outline your assessment of this patient. (80% marks)**

Aim: To assess the candidate's knowledge of acute intra-renal failure requiring an assessment (defined as History, Examination, and Investigations as per the Glossary of Terms).

Key sources include: 2016.2 Q13.3 explore one of the causes of intra-renal failure. CanMEDS Medical Expert.

Discussion: This patient had a classic nephritic syndrome presentation of renal failure. Some candidates suggested differential diagnoses including conditions that would account for some but not all the details given in the stem. These candidates did not score as highly as candidates who specifically addressed the clinical stem, for example detailing the glomerulonephritis causes as part of their differential.

Some candidates also included management in their answers, rather than confining to assessment. Management descriptions did not attract marks as the question was specific to assessment as outlined in the stem. Candidates are advised to use the glossary of terms to understand what information is required. The use of the glossary of terms will help focus your answer, improve accuracy of response, and reduce time wasted for no marks gained.

Candidates who did well stated what aspects of the history, examination and investigations were important and why. Well supported reasoning addressed the clinical scenario more effectively than listing general examination and investigation items without any justification. Many candidates focussed on toxidromes, seemingly ignoring the presence of severe proteinuria and lower limb swelling.

Maximum Score	8.000
Percentage scoring >5/10	33.3%

Question 7

Regarding the timing of infection after solid organ transplantation:

a. Outline the relative risk and reasons for infection in the early (<30days), intermediate (1-6 months) and late (>6 months) periods.

(30% marks)

b. List potential pathogens and sites of infection in each period.

(40% marks)

c. Comment on prophylaxis for the prevention of infection post solid organ transplant.

(30% marks)

Aim: To display a general awareness of post-transplant ID issues and principles of immunosuppression.

Key sources include: T Oh., All chapters on solid organ transplants. CanMEDS Medical Expert.

Discussion: A lack of depth and understanding of the different stages of immunosuppression was demonstrated by most candidates. The better answers highlighted the differences in infections at different stages of immunosuppression (early, intermediate, and late as stipulated in the stem.) and provided a rationale.

The expert answer detailed the risk of infections as being highest in the early post operative and intermediate stage and then falls as the immunosuppression requirements reduce and provided reasons why. The detailed answer outlined the common post operative infections including transplant-related and early hospital related infections and gave examples of likely pathogens at this time.

Opportunistic infectious aetiologies common to immunosuppressed patients were outlined in the successful answer.

Maximum Score	6.375
Percentage scoring >5/10	10.6%

Question 8

A 60-year-old patient is 1 week post laparoscopic right hemicolectomy for colonic cancer, complicated by an ileus. The patient is confused, and investigations show the following blood results.

Parameter	Patient Value	Adult Normal Range
FiO_2	VBG	
pH	7.59*	7.35 – 7.45
pCO_2	74* mmHg (9.8 kPa)	35.0 – 45.0 (4.6 – 6.0)
Bicarbonate	72* mmol/L	22.0 – 26.0
Base Excess	+46* mmol/L	-2.0 – +2.0
Lactate	1.5 mmol/L	0.5 – 1.6

Parameter	Patient Value	Adult Normal Range
Sodium	146* mmol/L	135 – 145
Potassium	3.3* mmol/L	3.5 – 5.0
Chloride	68* mmol/L	95 – 105
Bicarbonate	72* mmol/L	22.0 – 26.0
Glucose	6 mmol/L	3.5 – 6.0
Urea	24* mmol/L	3.0 – 8.0
Creatinine	232* µmol/L	45 – 90
Magnesium	0.59* mmol/L	0.75 – 0.95
Albumin	30* g/L	35 – 50
Protein	64 g/L	60 – 80
Total bilirubin	14 µmol/L	< 26
Ionised calcium	0.9* mmol/L	1.10 – 1.35
Calcium corrected	1.90* mmol/L	2.12 – 2.62

8.1. List the <u>four</u> most likely causes for the venous blood gas and biochemical results and explain the mechanism for the abnormalities in your answer.

(40% marks)

8.2. Briefly discuss your assessment to differentiate the causes of the above blood results.

(40% marks)

8.3. Outline the specific management options for the correction of the pH in this patient.

(20% marks)

Aim: To allow the candidate to display knowledge of acid base status and blood gas interpretation.

Key sources include: Common core knowledge topic. CanMEDS Medical Expert.

Discussion: Candidates did well if they used a structured approach to the questions. A structured approach was particularly important for 8.2. Assessment is defined as history, investigations and examination as detailed

in the glossary of terms. Discussion of differentiation of causes using these headings would help the candidate focus their answer, aid clarity, and help the candidate detail the content required to pass.

Candidates are advised to read the question as there were errors in using the ABG rules when the question stated VBG. These candidates did less well.

Maximum Score	7.500
Percentage scoring >5/10	59.1%

Question 9

You are called to the emergency department to see a 43-year-old patient who has been brought to hospital by ambulance after ingestion of a large quantity of commercial-grade drain cleaner.

The patient is stridulous, drooling, and tachypneic, with oedema and erythema of the lips and tongue.

a. Outline your assessment and management in the first 48-hours.

(90% marks)

b. List the long-term sequelae of a severe injury.

(10% marks)

Aim: To explore candidate understanding of the assessment and management of a toxicology patient with a threatened airway in the first 48 hours.

Key sources include: Paper 2000.1 Q6 concentrates on complications of corrosive ingestions. CanMEDS medical expert.

Discussion: Candidates who were specific in their response and answered the question from a practical perspective did well. The question asked for "your" assessment and management. Candidates who provided specific recommendations for the threatened airway and toxidrome gained more marks than candidates who listed all the potential strategies but did not recommend any particular course of action.

Candidates should note that although referral with other specialities is an integral part of ICU practice, to demonstrate a transitional fellow approach it is important to know and detail the *rationale* for the referral and desired outcome. Candidates who were explicit, specific, logical and with coherent synthesis were given more marks than answers which were vague, non-committal and potentially placed patient safely at risk. For example, a discussion of caution/avoidance in the use of nasogastric tubes or placement with aid of a gastroscope demonstrated that the candidate was aware of the high risk of perforation of hollow organs with mediastinal soiling.

Answers that were superficial and generic or incorrect were given less marks. For example, answers which focused on whole bowel irrigation or contact risk to staff were incorrect.

Candidates should note the glossary of terms for the definitions and subheadings of assessment and management which will help the candidate focus and give depth to their answer. Use of these headings to guide specific details contextualised to the clinical case provided will allow the candidate to demonstrate competency in this area and gain marks. The use of other templates such as DR RSI DEAD are perfectly acceptable however candidates answer in the R=risk management section was often lacking important historical details.

Maximum Score	7.500
Percentage scoring >5/10	25.8%

Question 10

Regarding the use of platform trials as a research tool:

a. Define platform trial. **(10% marks)**

b. Discuss the advantages and disadvantages. **(80% marks)**

c. List <u>two</u> examples of platform trials. **(10% marks)**

Aim: To explore candidate understanding of a specific type of research methodology which has been important in recent times.

Key Sources include: This is a repeat question of paper 2022.1 Q27. CanMEDS Scholar.

Discussion: This question was a straightforward and a pure knowledge-based question that had been asked in the very recent past. Candidates' responses would have been improved with more core knowledge of this important trial design.

Candidates generally answered reasonably well, and those who used the headings suggested were generally able to pass the question. Some candidates had little to say or did not attempt the question. Candidates are encouraged to attempt every question and are reminded there is no negative marking.

There are many points in the advantages and disadvantages that can be answered from first principles, and these were enough to pass the question, for example, commenting on the complexity of trial design, familiarity with the general medical cohort to interpret results, logistical challenges, efficiency, and flexibility. The better candidates were able to demonstrate more nuanced understanding of platform trials, such as the need to increase sample size when multiple trial arms were included, and the possibility that progressive changes to the control arm might make it hard to compare newer arms of the trial to the original cohort.

Maximum Score	7.750
Percentage scoring >5/10	56.1%

Question 11

a. Define systolic anterior motion (SAM) of the mitral valve. **(20% marks)**

b. List the risk factors for SAM? **(30% marks)**

c. Outline specific management of SAM causing hemodynamic instability, post cardiac surgery.

(50% marks)

Aim: To explore the issues in cardiac anatomy leading to haemodynamic instability with a particular focus on post cardiac surgery in part c.

Key sources include: Related question regarding dynamic left ventricular outflow tract obstruction in paper 2019.1 Q8. CanMEDS Medical Expert.

Discussion: Some candidates did very well, demonstrating an in-depth knowledge of the pathophysiology of SAM and dynamic LV outflow tract obstruction.

Understanding the pathophysiology is key to outlining the specific management. Expert pass answers outlined specific management of the unstable post cardiac surgery patient in detail and showed an understanding of the pathophysiology. These approaches gained more marks than answers which were superficial and contained generic statements. Examples of the expert pass specific management answers included the following:

- Outlining methods of rate control and its subsequent effect on reducing or worsening LVOT obstruction.
- A potential requirement for return to theatre in the post operative valve replacement (most common in the post operative AVR) demonstrating an understanding of the mechanics of obstructive shock in this context and requirement for definite treatment.

Maximum Score	7.500
Percentage scoring >5/10	66.7%

Question 12

Compare and contrast the use of Computed Tomography (CT) with Magnetic Resonance Imaging (MRI) in the assessment of suspected cervical spine injury, in ventilated patients following blunt trauma.

Please tabulate your answer under the following headings: Indications, advantages, and disadvantages.

(100% marks)

Aim: To explore the clinical issues of ventilated trauma management.

Key sources include: Paper 2020.2 Q14, same topic with a different approach. CanMEDS Medical Expert.

Discussion: Many candidates did well in the advantages and disadvantages section with a reasonable understanding of the disadvantages (of MRI particularly) and the relative sensitivities of the two modalities for different injuries. More emphasis on safety concerns would have improved some candidates' answers.

Candidates could improve their answers in the indications section by reading the details given in the stem. The NEXUS criteria are not relevant in an intubated patient.

Incorrect indications included "as part of a routine pan scan" and "neurosurgery or trauma request it".

To improve this answer the senior ICU practitioner should detail WHY the referring specialities are interested in ordering these scans for the treatment of the ventilated trauma patient. Adding these relevant facts would have allowed candidates to demonstrate depth of knowledge and score more marks.

Maximum Score	7.150
Percentage scoring >5/10	37.9%

Question 13

You are managing a patient with a possible cryptogenic organizing pneumonia (COP). They are receiving a high level of invasive respiratory support.

a. **List <u>five</u> differential diagnosis with similar presentation and imaging findings to COP.**

(25% marks)

b. **Outline the assessment of suspected COP.**

(50% marks)

c. **Discuss the rationale for bronchoalveolar lavage in the diagnosis of COP for this patient.**

(25% marks)

Aim: To explore the challenges of assessment and diagnosis of cryptogenic pneumonias.

Key sources include: A known clinical scenario with important diagnostic ramifications in the ICU. CanMEDS Medical Expert.

Discussion: Some candidates answered parts a) and c) in a reasonably inclusive manner. Many candidates' answers were incomplete or missing. Candidates are encouraged to attempt every part of the question and are reminded there is no negative marking.

Using the assessment structure as outlined in the glossary of terms would have helped candidates focus their answers and avoid incomplete attempts. Candidates who concentrated on bronchoalveolar lavage from a therapeutic perspective did not gain marks, as the question specifically asked for the diagnostic rationale.

The key issues of cryptogenic pneumonia assessment revolve around exclusion of other disorders which would contraindicate high dose steroids used in the treatment of COP. Candidates who included this in their answer were able to demonstrate an expert level of understanding.

Maximum Score	6.700
Percentage scoring >5/10	30.3%

Question 14

Discuss the approach to nutrition of the critically ill patient under the following headings: timing of initiation, route of nutrition, estimation of calorie requirements, and the requirements for macro and micronutrients.

(100% marks)

Aim: To allow the candidate to demonstrate knowledge of the provision of nutrition in the ICU.

Key sources include: This is a topic whose elements are repeated many times in case history format (2001.2 Q9, Discussions on timing (2022.2 Q9, 2019.2 Q9) estimation of caloric requirements (2015.1 Q7, 2007.2 Q28). CanMEDS Medical Expert.

Discussion: Given the frequency of this subject in the examination and in clinical practice a detailed and specific answer was required. These candidates who provided this did well. The most common reason for failure of this question were generic superficial statements and answers betraying a lack of knowledge or potentially poor time management.

The better answers included:

- Statements around timing including supportive evidence and patient prior nutritional status or caloric requirements (for example burns, trauma or already malnourished, relevant surgical issues).
- Routes of initiation included a discussion around appropriateness and patient selection of TPN vs enteral.
- An estimation of caloric requirements included a mention of equations (for example Harris Benedict amongst others). Expert answers included mention of hypocaloric feeding and energy dense vs routine feeds.
- Macro and micronutrients, a list of common deficient states to replace/maintain and rationale for same.

Maximum Score	7.000
Percentage scoring >5/10	57.6%

Question 15

15.1. A 65-year-old patient presents to the ED with persisting chest pain for one week. Following an acute severe episode that lasted for two hours. The 12 lead ECG taken on presentation is shown.

a. **Explain the ECG changes.** **(10% marks)**

b. **List the most likely diagnosis.** **(5% marks)**

The patient develops worsening chest pain and becomes more tachypnoeic and hypotensive.

List <u>three</u> likely causes for this deterioration. **(15% marks)**

15.2. A 45-year-old patient has been admitted to the hospital for investigation of syncope. A MET call is made for another syncopal episode. The 12 lead ECG is shown.

a. **Explain the ECG changes.** **(10%marks)**

b. **List the most likely diagnosis.** **(10% marks)**

c. **Explain the underlying pathophysiology.** **(10% marks)**

d. **List <u>four</u> clinical situations that can worsen this condition.** **(20% marks)**

15.3. A 75-year-old patient is admitted to the ICU with community acquired pneumonia suddenly develops tachycardia. The 12 lead ECG is shown below.

a. Explain the ECG and provide the diagnosis. (10% marks)

b. List <u>two</u> co-existing diseases in critically ill patients where this condition is commonly seen.

(10% marks)

(Image removed from report)

Aim: To allow the candidate to demonstrate expertise in the analysis of ECGs.

Key sources include: This is a repeat question from paper 2014.1 Q18. CanMEDS Medical Expert.

Discussion:

15.1 - The candidates who did well considered the clinical history provided, and correctly interpreted the ECG (e.g., did not confuse LBBB with RBBB).

15.2 - Brugada syndrome was not identified and was misdiagnosed on the ECG in many cases.

15.3 - Recognition of multifocal atrial tachycardia was poor.

Maximum Score	8.125
Percentage scoring >5/10	45.5%

Question 16

16.1 A 40-year-old patient with Acute Myeloid Leukaemia who received induction chemotherapy 1 week ago, was admitted to ICU from the ward with fever, chills, and repeated episodes of hypotension. Urine dipstick showed the following result:

Urine dipstick result	
Leukocytes	**Negative**
Nitrite	**Positive**
Protein	**+**
Glucose	**+++**

a) Explain the urine dipstick result. (15% marks)

b) Briefly outline the salient management principles. (10% marks)

16.2 A 50-year-old patient was found unconscious after an explosion in a chemical warehouse and was subsequently admitted to the ICU after initial resuscitation and intubation. The ICU nurse has observed reddish discolouration of the urine.

List the <u>three</u> most likely diagnoses, explaining the mechanism of the reddish urine discoloration for each likely diagnosis, and describe how to differentiate the three causes from each other.

(60% marks)

16.3 A 65-year-old patient is admitted to the ICU post excision of craniopharyngioma. Explain the following blood results, showing your calculations in your answer. (15% marks)

Plasma Parameter	Patient Value	Adult Normal Range
Sodium	**154* mmol/L**	**135-145**
Potassium	**3.6 mmol/L**	**3.5-5.0**
Urea	**2.7* mmol/L**	**3.0-8.0**
Creatinine	**37* umol/L**	**45-90**
Glucose	**8* mmol/L**	**3.5-6.0**

Urine Parameter	Patient Value	Adult Normal Range
Sodium	**36* mmol/l**	**20**
Osmolality	**133 mOsm/Kg**	**50-1200**

Aim: To allow the candidate to demonstrate expertise in data interpretation.

Key sources include: Common clinical practice with urinalysis, and paired urine and serum samples. CanMEDS Medical Expert.

Discussion:

16.1 - Candidates are encouraged to read the question carefully and refer to the glossary to ensure their answers address the question. Candidates who *explained* the abnormalities instead of just listing them gave the better answers and were marked accordingly. For example, the explanation for the absence of leukocytes is related to the neutropenia common in the immunosuppressed patient. The presence of nitrites points to the presence of bacteria.

Better answers also included salient management principles. For example, including rationale for the choice of antibiotic, a bullet point outline addressing of hypotension and the control of hyperglycaemia. The unsuccessful candidate listed a narrow spectrum of management, usually just related to antibiotics. Generic answers which ignored the clinical context provided did not score well.

16.2 - This question asked for three causes of reddish urine with a clinical history of trauma and chemical exposure and half the candidates were able to do that. Correct examples included three of the following four causes: haemoglobinuria, haematuria, myoglobinuria or hydroxocobalamin. G6PD deficiency was not given marks as it is much less likely in the given scenario than the stated four causes.

Most answers were incomplete with candidates not able to describe the mechanisms or differentiation of their stated causes. This may be due to inadequate reading of the question or a knowledge deficit. The better

candidate was able to address the clinical history in the stem and detail the mechanism and the differential process between the most likely diagnoses.

16.3 - Candidates are encouraged to read the question carefully and refer to the glossary of terms to focus their answers, candidates who *explained* the abnormalities instead of just listing the abnormalities gave more fulsome answers and were marked accordingly. Calculations were asked for and therefore if a *calculated* serum osmolality was present, it was marked higher than answers without a calculation. .

Maximum Score	6.650
Percentage scoring >5/10	10.6%

Question 17

You are called urgently to the bedspace of a 58-year-old patient in the ICU, due to profuse bleeding at the site of a five-day-old tracheostomy.

a) List the potential causes for post-tracheostomy bleeding, under the following headings.

(40% marks)

i. Early (<72 hours)

ii. Late (>72 hours)

b) Outline your emergency assessment and management plan for this patient.

(60% marks)

Aim: To allow the candidate to display management of a common issue in ICU.

Key sources include: A common clinical problem in the ICU. CanMEDS Medical Expert.

Discussion: Most candidates did well in this question. The question clearly states profuse bleeding, so most candidates went straight to assessment and management as an emergency airway problem which is reasonable and appropriate. All candidates mentioned tracheoinnominate fistula as a cause of late tracheostomy bleeding but not infection which is more common. Candidates who mentioned both causes displayed a greater understanding of the topic and were marked accordingly.

Unsuccessful candidates had an insufficient list of causes and poor structure to manage tracheostomy bleeding. Few gave details of what they would seek in the history to help diagnose the site of bleeding. Some candidates mentioned procedural detail but not the rationale for action. This would have improved their answer and displayed a senior, mature approach to the situation.

Maximum Score	6.500
Percentage scoring >5/10	72.7%

Question 18

Regarding prediction scoring systems in the ICU.

Discuss one commonly used example under the following headings: Components, advantages, disadvantages, and its use in the ICU.

(100% marks)

Aim. To explore the candidate knowledge of APACHE, SAPS, MOPS and use in ICU practice.

Key sources include: Paper 2009.1 Q11 - comparing APACHE with SOFA. 2005.2 SQ 4 - principles of Illness severity scoring systems in the critically ill pt. Systems in use daily in ICUs outcomes comparisons. CanMEDS scholar.

Discussion: Scoring systems used to predict mortality and other outcomes are universal in Australian and NZ ICUs. Trainees/SIMGs should be encouraged to have a working knowledge of those commonly used in the Binational ICU registry and assessment of risk severity in research. A demonstrated knowledge of any of the ICU prediction scoring systems gave an expert pass.

Given the wording of the question, other prediction scoring systems used in the ICU such as Child-Pugh scores would have answered the stated question. Examiners gave credit as the answers corresponded to the question asked.

The GCS is not in itself a predictive scoring system and was marked incorrect as it did not address the question. Other ways to improve the answer detail required included exploration of scoring systems derivation as part of the explanation of the components.

Maximum Score	7.800
Percentage scoring >5/10	50.0%

Question 19

Discuss the practice of clamping of the endotracheal tube, under the following headings:

Indications, contraindications, and detrimental clinical sequelae.

(100% marks)

Aim: To explore an airway practice more common in the ICU since Covid19.

Key sources include: Procedure seen in clinical practice. CanMEDS Medical Expert.

Discussion: This is a common procedure designed to limit the aerosolization of pathogens and prevent lung de-recruitment. This procedure is especially important in NICU /PICU and in high PEEP strategies with ARDS.

Candidates did well if they gave details and rationale for the procedure and related it to their clinical practice. For example, detailing the requirements for a blunt clamp -/+ gauze squares to avoid trauma to the endotracheal tube. Candidates also gained marks if they identified common clinical scenarios and explained this in detail for example, some endotracheal tubes cannot be clamped (reinforced tubes). Other examples included an indication that this procedure is inappropriate in some patients e.g., awake, aware, and spontaneously breathing.

Candidates are encouraged to answer clinical questions in detail and provide rationale to demonstrate familiarity with aspects of clinical practice, to demonstrate clinical competency.

Maximum Score	6.750
Percentage scoring >5/10	31.8%

Question 20

a) **Compare and contrast the use of Tacrolimus, Mycophenolate and Prednisolone when used in solid organ transplantation with specific reference to mechanism of action and monitoring.**

(30% marks)

b) **List the non-infectious complications associated with each of the above medications.**

(70% marks)

Aim: To explore the side effects of immune suppression drugs commonly seen in the ICU.

Key sources include: Common scenarios in clinical practice with solid organ transplants. TE Oh Ed 8. Chapters on Heart, Liver and Lung transplants, sections on post-transplant management. CanMEDS Medical Expert.

Discussion:

A) A high level of detail in the mechanism of action and monitoring was <u>not</u> required to pass. Despite this many candidates did not attempt the question including indications or the requirement for monitoring. Candidates are strongly advised to attempt every question.

B) A structured approach to the non-infectious complications distinguished the better answers. For an example of a successful systems-based approach see below:

Tacrolimus:

Renal: nephrotoxicity and AKI

CNS: headache, seizures, tremors, confusion

Haematological: Bone marrow suppression causing anaemia
Endocrine and metabolic- Diabetes after transplant, hyperkalaemia, hypomagnesaemia

CVS: HTN

GI: N+V+D anorexia

Increased Malignancy risk.

Maximum Score	6.750
Percentage scoring >5/10	13.6%

Question 21

Regarding sedation in the routine care of the intubated ICU patient.

a) **Discuss the Richmond Agitation Sedation Scale under the following headings: purpose, components, advantages, and disadvantages.**

(40% marks)

b) **List three trials investigating the use of dexmedetomidine infusions in the ICU. For each trial briefly outline the methods, key results, and conclusions.**

(60% marks)

Aim: To explore the evidence and practice surrounding the use of sedatives in the ICU.

Key sources include: ANZICS trials, major landmark trials, and current practice guidelines for sedation. CanMEDS Medical Expert, Scholar.

Discussion: The RASS score is a commonly used scale for agitation/sedation in the ICU daily practice and sedation research. Candidates are expected to understand the evidence base of clinical practice and the drugs we use routinely.

The successful candidate utilised their bedside experience, had a practical approach to the answer by addressing the subheadings and had a broad understanding of the literature on dexmedetomidine.

Part b required only brief outline of the key results and conclusions of the relevant trials. Candidates are not expected to go into depth about individual trials given the time constraints of the examination. A broad outline of the trial aim, results and conclusions sufficed.

The successful candidate demonstrated familiarity with the current research particularly in relation to the ANZICS SPICE trial. Candidates passed if they outlined the major findings and included brief notes on trial design.

The number per trial arm, journal name and date published, and secondary outcomes were NOT required. The trials listed below are provided to guide candidates with information to aid future study.

-Spice III

NEJM May 2019

In ventilated patients does Dexmedetomidine as the primary sedative agent compared with usual sedations affect 90-day mortality?

-MINDEX/PRODEX trials

JAMA 2012

Is Dexmedetomidine inferior to propofol or midazolam in achieving target sedation level?

-DahLIA trial

JAMA March 2016

Effect of Dexmedetomidine added to standard care on ventilator free time in patients with agitated delirium.

-Low dose nocturnal dexmedetomidine prevents ICU delirium: a RCT placebo-controlled trail

Skrobik AJRCM 2018

-DESIRE

Effect of Dexmedetomidine on Mortality and ventilator free days in patients requiring mechanical ventilation with sepsis RCT

JAMA 2017

Maximum Score	7.000
Percentage scoring >5/10	15.2%

Question 22

A patient is admitted to the ICU with a history of systemic sclerosis.

Discuss the implications for intensive care management of the following aspects.

a) **Cutaneous manifestations of systemic sclerosis.** **(20% marks)**

b) **Cardiovascular manifestations of systemic sclerosis.** **(40% marks)**

c) **Respiratory manifestations of systemic sclerosis.** **(40% marks)**

Aim: To explore how multisystem disease processes affect ICU treatment.

Key sources include: Clinical case mix. CanMEDS Medical Expert.

Discussion: This question mimics the miscellaneous multisystem disease topics on rheumatoid arthritis (2019.2 Q11) scleroderma, and obesity (2012.1 Q28, 2008.2 20.1, 2003.2 Q8).

Candidates were asked to *discuss the clinical implications for intensive care management.* Candidates are encouraged to follow the directions of the question as candidates who did this received a passing mark. The unsuccessful candidates simply listed the abnormalities found in systemic sclerosis. This did not address the question asked. In many instances the implications for intensive care management were missing or superficial.

Answers demonstrating awareness of the ICU implications include but are not limited to the following examples:

Cutaneous: Potentially difficult intubation as limited mouth opening and limited soft tissue mobility. Fixed flexion deformities in advanced disease will increase pressure area risk.

Respiratory: Pulmonary fibrosis increasing barotrauma risk, 2' to low compliance. Increased risk of right heart failure 2' to chronic corpulmonalae requiring PEEP titration to avoid excessive RV afterload.

Maximum Score	7.000
Percentage scoring >5/10	15.2%

Question 23

You are asked to review a 75-year-old man who has developed sudden onset hypotension, with a systolic BP of 70mmHg and an associated sinus tachycardia of 140 bpm, 30 minutes post TAVR (transcatheter aortic valve replacement) via the trans-femoral approach.

a) List <u>four</u> cardiac differential diagnoses of hypotension. (20% marks)

b) List <u>four</u> non-cardiac differential diagnoses of hypotension. (20% marks)

c) Explain which features on history, clinical examination, and investigations, may help differentiate cardiac from non-cardiac causes? (60% marks)

Aim: To explore the complications of a common cardiology procedure.

Key sources include: Common cardiology procedure seen in clinical practice. CanMEDS Medical Expert.

Discussion: This topic was generally well addressed by candidates with the non-cardiac causes of hypotension e.g., femoral access retroperitoneal bleed or anaphylaxis, well recognised.

Candidates would have improved their answers if they gave cardiac differentials specific to the clinical case provided outlining post-TAVR instability.

For example, a discussion around severe AR/paravalvular leak from TAVR malposition or ventricular perforation/aortic root rupture related tamponade would have allowed the candidate to demonstrate competency with the assessment of the post TAVR unstable patient and improve their answer in part a and c.

Maximum Score	8.000
Percentage scoring >5/10	74.2%

Question 24

A patient in your ICU is ventilated post trauma and has an intercostal catheter in situ, for an initial hemopneumothorax on admission.

a) Outline the clinical features that would make you suspect the patient has developed an alveolar or broncho-pleural fistula causing an air leak.

(25% marks)

b) List three ways to assess the extent of the air leak. (15% marks)

c) Outline the non-operative management of the air leak with respect to: (45% marks)

i. Ventilatory management.

ii. Intercostal catheter management.

D) List three interventions for an air leak that is refractory to the use of non-operative management.

(15% marks)

Aim: To allow the candidate to display knowledge of management of traumatic broncho-pleural fistula.

Key sources include: Papers 2014.1 Q4, 2017.2 Q3, 2019.1 Q23, CanMEDS Medical Expert.

Discussion: Alveolar or bronchopleural fistula (BPF) is a problem of significance and candidates who passed this question were able to correctly outline clinical features and list ways to assess the extent of an air leak.

Examples of successful answers included descriptions of patterns of bubbling, and air leak quantification either clinically or using ventilator parameters (tension or expanding pneumothorax and pneumomediastinum, various ventilator infographics and measurements).

A general lack of detail regarding parts c and d was common in answers that scored fewer marks. Candidates could have improved their answers by explaining the clinical concerns with the use of PEEP. PEEP application via the ICC was commonly described by candidates but without describing the risks. Some examples of other strategies to manage a BPF included an outline of how and why to aim for spontaneous ventilation, with or without early extubation, ensuring patency connection and correct sizing of ICCs and a discussion on the advantages and disadvantages of suction.

Answers to part d) would have improved by including (but not limited to) references to extracorporeal lung rest, bronchial occlusion devices, and various surgical options from blood patches to highly invasive surgery. Broncho-pleural fistula has appeared many times in the fellowship examination and candidates are advised to read widely around repeated topics.

Maximum Score	7.750
Percentage scoring >5/10	51.5%

Question 25

A 45-year-old patient presented to the emergency department with a five-day history of nausea and vomiting and one day of slurred speech. Syndrome of inappropriate antidiuretic hormone secretion (SIADH) was suspected due to sodium level of 110 mmol/l.

a) **List <u>five</u> alternative differential diagnosis in this patient with severe hyponatremia, and a high urine sodium and osmolality?**

(25% marks)

b) **Outline the management principles for the use of hypertonic saline (3% NaCl) in symptomatic acute hyponatremia and include the calculations in your answer.**

(50% marks)

c) **List <u>five</u> risk factors for development of osmotic demyelination syndrome.**

(25% marks)

Aim: To explore the candidate knowledge of SIADH and allow the candidate to display familiarity with the clinical use of 3% saline.

Key sources include: Paper 2009.1 Q14.4, 2017.2 Q5, CanMEDS Medical Expert.

Discussion. The successful candidate in part a was able to list differential diagnoses for severe hyponatraemia AND a high urinary sodium and osmolality as requested. Candidates scored less marks if they listed general causes of hyponatraemia.

Calculations were asked for in part b and candidates who provided an estimation of the sodium deficit and calculated the amount of 3% saline required to correct it scored highly. The expert pass commented on rates of administration, provided rationale behind the recommendations, and provided safe guidelines for sodium correction over 24 hours in the context of the acute symptomatology.

Many candidates were unable to list five risk factors for part c. This may be due to a knowledge deficit or misreading of the question. Candidates are reminded to read the questions carefully and attempt to answer every question.

Maximum Score	7.000
Percentage scoring >5/10	40.9%

Question 26

Regarding hypoxic respiratory failure due to ARDS:

a) **Outline <u>four</u> different methods you may use to determine what PEEP to set as part of the ventilatory management.**

(80% marks)

b) **List <u>four</u> patient factors that might impact your PEEP setting.**

(20% marks)

Aim: To explore the candidate knowledge of ventilation strategies.

Key sources include: Paper 2016.2 Q 29. TE Oh Ed 8 Chpt 31 Mechanical ventilator support Chpt 33 ARDS. CanMEDS Medical Expert.

Discussion: The successful candidate was able to *outline* four different methods and provide details of each method to guide the ventilatory management strategy for best PEEP. Candidates who *listed* four methods without explanation scored less marks.

For example, outlining methods included explanations of compliance curves, supporting evidence for methods of PEEP titration (for example ARDSnet tables or PHARLAP) or a discussion of oesophageal balloon use in the titration of PEEP. Inclusion of these methods and the rationale improved the depth of answer and scored more marks.

Maximum Score	7.750
Percentage scoring >5/10	51.5%

Question 27

Outline the role, advantages, and disadvantages of the following neuro-monitoring modalities, used in an intubated ICU patient with severe traumatic brain injury.

a) Clinical assessment. (20% marks)

b) ICP monitoring. (30% marks)

c) Cerebral blood flow monitoring. (30% marks)

d) Cerebral function and metabolism. (20% marks)

Aim: To explore the options available for neuromonitoring in TBI.

Key sources include: Paper 2010.1 Q8 compare and contrast EVD and fibre optic. 2009.2 Q25.1 - clinical assessment. CanMEDS Medical Expert.

Discussion: Parts a, b and c are repeat explorations of this topic. Many candidates did not gain marks by not attempting parts of the question. Marks were gained by answering questions discussing first principles. Whilst some techniques described in the question are not available in all centres, the principles underpinning their use are simple and well described in textbooks. Candidates are reminded that there is no negative marking, and it is recommended to attempt all parts of the question.

First principle examples would include details on availability, cost, invasiveness, reproducibility, type, and volume of information gathered and complications.

Maximum Score	6.250
Percentage scoring >5/10	51.5%

Question 28

28.1 A 76-year-old patient is admitted to the ICU with drowsiness and hypoxia after elective surgery. The pre-surgical workup included outpatient pulmonary function tests. The results are shown below:

	Predicted	Actual	% predicted	Post bronchodilator	% change
FVC	4.68	2.71	58	2.76	+2%
FEV1	3.74	2.36	63	2.47	+5%
FEV1/FVC	85	87	102	89	+2%
TLC	6.62	4.67	71	-	-
DLCO	34.53	30.01	87	-	-
KCO	5.21	6.51	125	-	-

FVC: Forced vital capacity (L)

FEV1 Forced expiratory volume in 1 second (L)

FEV1/FVC Ratio of the above (%)

TLC: Total Lung capacity (L)

DLCO: Diffusing capacity for carbon monoxide, corrected for Hb (mL/min/mmHg)

KCO = DLCO / alveolar volume (VA) (mL/min/mmHg/L)

a) **Explain the results of the outpatient pulmonary function tests.**

(20% marks)

b) **List <u>two</u> likely causes for the abnormalities on the pulmonary function tests.**

(20% marks)

c) **Outline and explain the results you would expect to see on an arterial blood gas analysis, in the current (acute) clinical scenario.**

(20% marks)

28.2. A 63-year-old patient with a history of smoking underwent outpatient spirometry for investigation of chronic cough and breathlessness. The flow-volume loop obtained is shown. The expected curve is shown in grey, with the patient's result in red.

(Image removed from report)

a) **List with examples, <u>three</u> possible mechanisms for the pattern seen above.**

(10% marks)

b) List <u>three</u> possible causes of a reduced DLCO on pulmonary function tests. For each condition listed, briefly outline the expected findings on lung spirometry (FEV1, FVC and FEV1/FVC).

(10% marks for each condition listed, 30% total)

Aim: To explore the candidate understanding of common measurements of respiratory function and interpretation.

Key sources include: Paper 2011.1 Q9.1 repeated 2014.1 Q21.2., 2018 26.1, CanMEDS Medical Expert.

Discussion: Common non acute, non-ICU investigations that might influence ICU practice are considered appropriate topics for inclusion in the examination. **28.1 -** Many candidates answered parts a and b well. A restrictive defect (reduced lung capacity) with a normal lung diffusion capacity was correctly interpreted and successful candidates were able to provide differentials for this. These included but were not limited to a chest wall abnormality and morbid obesity.

Part c was answered poorly. Better answers referred to the clinical context provided in the question, understood the meaning behind the PFTs, and could make clinical deductions based on the provided history and investigations.

For example: The history provided of a drowsy hypoxic post operative patient is likely to have an ABG showing a respiratory acidosis with hypercapnia and decreased pO2.

In this patient an elevated A-a gradient may be present IF there is a primary respiratory issue (e.g., aspiration post op, or pulmonary embolus) as the prior pulmonary function tests state the diffusion gradient is normal.

There would be no elevated A-a gradient if the hypoxia was hypoventilation only.

Understanding and recognition of the two potential blood gas results has the ability to influence management. (i.e., requirement for a CTPA).

28.2 - Answers which addressed the potential mechanisms which included chronic obstructive airways disease, variable intrathoracic airways obstruction and listed potential causes scored well.

Three possible causes of reduced DLCO included but were not limited to interstitial lung disease, severe emphysema, pulmonary embolism, and pneumonectomy. Most candidates were successfully able to give the expected findings of these pathologies on lung spirometry.

Maximum Score	7.900
Percentage scoring >5/10	56.1%

Question 29

a) **Explain the principles of operation of pulse oximetry.**

(40% marks)

b) **Explain the technological principle used in finger probes verses forehead probes in pulse oximetry and outline how it would affect assessment in the critically ill patient.**

(20% marks)

c) **List <u>eight</u> causes of a false reading of S_pO_2 and outline for each cause how you would gain a more accurate value of the S_PO_2.**

(40% marks)

Aim: To explore understanding of a ubiquitous piece of equipment.

Key sources include: Paper 2000.1 Q9, 2010.1 Q17.2, CanMEDS Medical Expert.

Discussion: The many causes of false readings were reasonably done by some candidates. Successful answers discussed the dyshaemoglobinaemias, low perfusion states and extremes of oxygen dissociation curves and various artifactual causes amongst others.

Candidates who were unable to provide specific details of the underlying principles around the operation of a common and mandated piece of equipment in the ventilated sedated patient scored poorly. It is important to understand the technological basis and limitations of standard equipment used in the care of the critically ill and this sections marking was weighted accordingly.

Forehead probes are a newer technology and so were weighted less in marks as they are used less often than the finger probes. Successful answers detailed the use of reflectance technology. The reflectance sensor has emitter and detector components adjacent to one another, so oxygen saturation is estimated from back-scattered light rather than transmitted light. In critically ill patients with low perfusion SpO2 is more reflective of the SaO2 for the forehead reflectance probe than for the finger probe.

Maximum Score	7.833
Percentage scoring >5/10	27.3%

Question 30

Discuss the Extended Spectrum Beta-Lactamase producing micro-organisms (ESBL) under the following headings:

a) **List <u>six</u> ESBL producing micro-organisms commonly encountered in the ICU. (30% marks)**

b) List <u>four</u> risk factors for ESBL producing micro-organism development. (20% marks)

c) Outline infection control measures for ESBL producing micro-organisms. (50% marks)

Aim: To allow the candidate to demonstrate familiarity with multi-resistant organisms.

Key sources include: Papers 2014.1 Q3.3, 2009.1 Q 25.2 CanMEDS Medical Expert.

Discussion: This is a core topic with increasing importance in current ICU practice. The overall standard of response to this question was commendable.

Expert answers included a thorough detailing of infection control measures and listing the relevant organisms. Candidates who failed to gain marks did so mainly in part b) with a knowledge deficit in relation to the risks of ESBL development.

Maximum Score	8.667
Percentage scoring >5/10	90.9%

The report continues on the next page.

SECOND PART ORAL EXAMINATION

CLINICAL "HOT CASES" SECTION

EXAMINERS' COMMENTS

The hot cases run for twenty minutes with an additional two minutes at the start of each case for the candidate to be given both a verbal and a written introduction to the case in question. This is to give candidates more opportunity to take in the relevant information and to plan a focussed approach to examination of the patient.

The following comments are a guide to the expected standard for performance in the hot cases:

- Candidates should demonstrate professional behaviour, treating the patient with consideration and respect.
- Candidates should address and answer the question asked of them in the introduction to the hot case.
- Candidates should interpret and synthesise information as opposed to just describing the clinical findings.
- Candidates need to seek information relevant to the clinical case in question.
- Candidates should be able to provide a sensible differential diagnosis and appropriate management plan. A definitive diagnosis is not always expected and, in some cases, may yet to be determined.
- Candidates should not rely on a template answer or key phrases but answer questions in the context of the clinical case in question.
- Candidates must be able to describe, with justification, their own practice for specific management issues.

Candidates who performed well in the hot cases, as in previous exams, were able to demonstrate the following:

- A professional approach showing respect and consideration for the patient.
- Competent, efficient, and structured examination technique and able to appropriately adapt the examination to suit the clinical case in question.
- Seeking of information relevant to the case.
- Appropriate interpretation and synthesis of their findings.
- Presentation of their conclusions in a concise and systematic fashion, addressing the issue in question.
- Listing of a differential diagnosis that is relevant to the clinical case in question.
- Appropriate interpretation of relevant investigations.
- Discussion of management issues in a mature fashion, displaying confident and competent decision-making.
- An appreciation of the complexities and key issues of the case.
- Overall performance at the expected level (transitional fellow).

Candidates who did not perform at the acceptable standard did so for reasons including the following:

- Missing or misinterpreting key clinical signs on examination.
- Failure to perform a focussed examination relevant to the case in question.
- Incomplete or poor technique for examination of a system.
- Poor synthesis of findings with limited differential diagnosis, sometimes compounded by missed key clinical signs on examination.
- Poor interpretation of imaging and data.
- Failure to demonstrate understanding of the key issues relevant to the case in question and a lack of insight into the problems.
- Inability to construct an appropriate management plan for the case in question.
- Hesitancy and/or uncertainty in stating a management plan.
- The need for significant prompting during the discussion with knowledge gaps.
- Limited time for discussion as a consequence of taking too long to present the clinical findings or to interpret basic data.
- Inability to convey the impression that they could safely take charge of the unit.

It is apparent that some candidates are very nervous, and this may adversely affect their exam performance. Candidates badly affected by nerves may benefit from sessions with a performance psychologist, drama coach, public speaking coach or similar.

Candidates are advised that they should not sit the Second Part Examination until they can confidently examine patients, present the relevant clinical findings, synthesise all the information and discuss management issues at the appropriate level**, which is a trainee who is ready to enter the transition year of the CICM training program, by demonstrating they have the ability for safe, effective, independent practice as an Intensivist.** Candidates who have not yet attained this level of experience are strongly encouraged to defer their attempt at the exam. Candidates should practise hot cases from the commencement of their exam preparation. To this end, candidates are encouraged to do the following in their daily clinical practice as preparation for the hot cases:

- Seek the opportunity to take charge of the unit and be responsible for management decisions.
- Practise examination of individual systems.
- Treat every case to be assessed at work as a hot case, i.e., pose a relevant question (e.g., 'Why is this patient not progressing?' 'What is the cause of the new fever?' 'Is this patient ready for extubation?'), perform a focussed exam and then present your findings to a colleague.

SUMMARY OF CLINICAL "HOT CASES"

The clinical 'hot cases' require candidates to assess patients currently in the ICU, regarding answering specific questions around clinical assessment, including diagnosis, relevant investigations, and aspects of management. Five examples of clinical 'hot case' questions from this examination sitting are given below.

- *A 63-year-old female presented to the ICU 3 days ago from the ward following development of respiratory failure on a background of recent VATS. She has a background history of IHD and a 25-pack year smoking history. She is intubated and ventilated. Please examine her and provide a differential diagnosis for her respiratory failure and an ongoing management plan.*

- *A 45-year-old man presented the ED 6 days ago with a low consciousness state. He has a background medical history of hypertension. He is intubated and ventilated. Please examine this patient and outline a management plan to investigate his neurology.*

- *A 53-year-old man has been in the ICU for 15 days with a background history of severe necrotizing pancreatitis with multiple complications. He has had a long hospital stay with multiple ICU readmissions. He has no prior medical history. He is currently intubated and ventilated. Please examine him to determine the current issues and determine a management plan.*

- *A 65-year-old female has presented to the ICU 7 days ago following a small bowel perforation during adhesiolysis for small bowel obstruction. She has a background history of childhood burns. She is intubated and ventilated. Please examine her with particular attention to assessing her for possible extubation.*

- *A 32-year-old-male was admitted to the ICU 7 days ago following fever and hypoxia for a staphylococcus bacteremia. He has a background history of penicillin anaphylaxis and a perianal abscess drained 8 days ago. He is mechanically ventilated and on VV ECMO with positive persisting blood cultures. Please examine and provide a reason for the ongoing bacteraemia.*

The clinical hot cases were examined at College accredited training Intensive Care Units in Sydney, NSW on Wednesday 3 May 2023.

VIVAS

The overall pass rate for the vivas was 84%, compared with 36% for the written paper and 56% for the hot cases, with vivas 5 and 8 on day 1, and vivas 1 and 4 on day 2, being answered poorly. Failure to pass a viva was often due to knowledge gaps, poorly structured answers, and an inability to give the rationale for their responses. As in the discussion for the hot cases, candidates should not rely solely on generic statements, key-phrases, and template answers, and, instead, tailor their responses to the specifics of the question and be able to justify and expand their response. Candidates are encouraged to practise viva technique and to discuss patient management, including the rationale for their decisions, with senior colleagues. As with the hot cases, candidates who are very nervous or have a poor technique may benefit from training with a performance coach.

VIVA STEMS

DAY 1 – THURSDAY 4 MAY 2023

Viva 1

You are reviewing a 68-year-old man who has been intubated and ventilated in the Emergency Department with a diagnosis of severe community-acquired pneumonia.

He is in atrial fibrillation with a ventricular rate of 80-100 beats per minute and has a mean arterial pressure of 50 mmHg despite a high dose peripheral metaraminol infusion.

Outline your immediate cardiovascular assessment and management plan.

This viva opened with a discussion of cardiovascular management plan of a cardiovascular unstable patient atrial fibrillation with rapid ventricular response in the context of sepsis. The role of continuous cardiac output monitoring was explored. An exploration of distributive and cardiogenic shock management including fluid resuscitation, ventilation, and sedation strategies.

Maximum Score	6.50
Percentage Passed	56.25%

Viva 2

You are called to the emergency department of your tertiary hospital to assist in the resuscitation of a previously well, intubated, 57-year-old male patient who has suffered an out of hospital cardiac arret (OOHCA). He has received 8 minutes of CPR, 1 DC shock and has had return of spontaneous circulation. He has just arrived in the ED with a systolic BP of 85 mmHg.

What are the likely cardiorespiratory differential diagnoses for the arrest and outline your initial assessment in the emergency department.

This viva explored the differential diagnosis, assessment, and management strategies of OOHCA. Complications of management strategies were explored.

Maximum Score	8.00
Percentage Passed	93.75%

Viva 3

You have been asked to assess a 52-year-old male in Emergency Department who presented after a high-speed motor bike accident. He was wearing a helmet and was hit by a utility vehicle from the left. He is alert and is complaining of severe pain over his left torso. He has cervical spine immobilization in place and has received two litres of normal saline and four units of packed red cells.

His vitals are:

- Heart Rate: 135 beats per minute sinus rhythm
- Blood Pressure: 80/50 mmHg
- Respiratory Rate: 30 breaths per minute
- SpO_2: 90% on non-rebreather mask at 15 litres per minute

The primary survey has been completed.

What are the broad clinical issues to consider in determining your ongoing assessment and management of this patient?

This viva explored the multi-trauma patient, organisational aspects, and management strategies. A discussion of Ventilation strategies for complex thoracic injuries. The approach to analgesia and further management of the long stay trauma patient.

Maximum Score	8.30
Percentage Passed	75.00%

Viva 4

A 45-year-old morbidly obese female patient is admitted to ICU from surgical ward following a Rapid Response call. She was admitted 24 hours ago for acute gall stone pancreatitis.

She has abdominal pain and fever (temperature - 38.9 degree Celsius) and has received 5 litres of intravenous fluid. Her vital signs are:

- Heart Rate: 120 beats per minute with sinus rhythm
- Blood pressure: 90/40 mmHg
- Respiratory rate: 32 breaths per minute
- SpO_2: 93% on high flow nasal O_2 (FiO_2 0.4, flow 40 litres per minute)

What are the likely causes for her deterioration and how would you investigate?

This viva focused on Pancreatitis, early and late management and associated clinical issues.

Maximum Score	7.75
Percentage Passed	81.25%

Viva 5

A 48-year-old man has been admitted to your intensive care with a one-week history of dry cough, progressive dyspnoea, and hypoxic respiratory failure.

He has a history of renal transplant five years ago for diabetic kidney disease. He is prescribed mycophenolate, tacrolimus, and prednisolone.

His vital parameters at presentation are:

- Temperature: 38.5^0C
- Heart rate: 125 beats per minute (sinus rhythm)
- Blood Pressure: 116/56 mmHg
- Respiratory Rate: 34 breaths per minute
- SpO_2: 92% breathing 15-litres oxygen through non-rebreathing mask

The Chest X-ray shows bilateral diffuse interstitial infiltrates with a normal cardio-thoracic ratio.

Outline your approach to investigating this presentation and provide your differential diagnoses.

This viva focused on the medical complications and management of an immunosuppressed patient.

Maximum Score	7.35
Percentage Passed	43.75%

Viva 6 – Radiology Station

The radiology station consisted of 4 plain X-rays and 3 CT scans.

Maximum Score	6.40
Percentage Passed	62.50%

Viva 7 – Procedure Station

You are reviewing a 79-year-old male who was admitted to ICU post aortic valve replacement for severe aortic stenosis.
He was extubated and progressed well overnight, with mediastinal and chest drains removed 2 hours ago. On review, the patient's vital signs are as follows:

- Heart rate: 58 beats per minute
- Blood Pressure: 80/45 mmHg
- Respiratory Rate: 22 breaths per minute
- SpO_2: 94% on 4 litres per minute via nasal prongs

The patient has both atrial and ventricular epicardial wires and the temporary pacemaker is set at a backup rate of 50 bpm in VVI mode.

Discuss the initial assessment and management of this patient and explain your clinical reasoning for the same.

This viva focused on epicardial lead temporary pacing in the setting of cardiothoracic surgery.

Maximum Score	8.00
Percentage Passed	75.00%

Viva 8 – Communication Station

Margaret is an 85-year-old frail lady who has just arrived in the ICU from theatre, having had a simple ureteric stent insertion. She has been found to have suxamethonium apnoea after surgery and could not be extubated. She is now starting to make some voluntary respiratory efforts.

Margaret had previously made it clear to the family (granddaughter/grandson) that she would never want to go to the ICU or remain on mechanical ventilation (no personal Advanced Care Directive but a strong opinion and she re-iterated this prior to surgery to her granddaughter and the surgeon).

She is required to be admitted to the ICU post-operatively until the medication effect wears off.

The grandchild (Alex) is angry this has happened as they were promised by the surgical team that this would not occur as the procedure was simple.

Alex is waiting to meet with you for an explanation.

N.B.: Reminder for candidates to <u>not</u> to shake hands with the actors.

This viva focused on communication of an adverse event and establishment of rapport and trust with the actor.

Maximum Score	8.75
Percentage Passed	43.75%

<u>DAY 2 – FRIDAY 5 MAY 2023</u>

Viva 1

You are asked to see a 25-year-old, previously fit man who presented with a two-week history of high-grade fevers and shortness of breath.

His current vitals are as follows:

- Heart Rate: 130 beats per minute, sinus rhythm
- Blood Pressure: 110/95 mmHg
- Respiratory Rate: 30 breaths per minute
- SpO_2: 92% via 60% high flow nasal oxygen

He is drowsy and still orientated.

This viva focused on a discussion of the cardiovascular aspects of septic shock, an exploration of the investigations and therapies for septic shock and infective endocarditis.

Maximum Score	8.00
Percentage Passed	62.50%

Viva 2

A young man is transferred to your ICU from a rural emergency department following a motorbike accident. He has had a pan-CT in the rural hospital showing no obvious head, neck, spinal, chest or abdominal injuries but he has multiple pelvic fractures and bilateral closed femoral fractures. He was intermittently hypotensive during transport.

On arrival his vital signs are:

- GCS is 15
- Systolic blood pressure: 105mmHg
- Heart Rate: 100 beats per minute

He is immobilised with spinal precautions and has a pelvic binder in place. He is complaining of pain in his lower abdomen and says he is unable to pass urine.

The nurses request an IDC be inserted as he is in pain.

What issues will you consider in responding to this request?

This viva focused on multi-trauma and management strategies. Complications of management strategies.

Maximum Score	8.62
Percentage Passed	87.50%

Viva 3

A 50-year-old male is admitted to ICU for severe hypoxemic respiratory failure secondary to COVID-19.

His background history includes severe ankylosing spondylitis.

He desaturates to an SpO_2 of 75% immediately on disconnecting the Non-Invasive Ventilation (PS 10 PEEP 10, FiO_2 0.6) and his work of breathing remains high.

Outline the broad principles you will consider in planning intubation in this patient?

This viva focussed on the challenging airway, organisational and management strategies. Ventilation strategies for complex thoracic pathology. Further management of the long stay medical patient.

Maximum Score	6.15
Percentage Passed	62.5%

Viva 4

A 34-year-old man, with no significant past medical history; is involved in a BBQ explosion at home. He has severe deep burns as shown below. He is brought to the Emergency Department (ED) of your hospital which is the regional burns centre. He has no other injuries. He is intubated in the ED. It is a Grade 1 view with no laryngeal oedema.

Outline the assessment and management of fluid resuscitation of this patient.

This viva focused on the early and late management of burns and the complications.

Maximum Score	7.40
Percentage Passed	56.25%

Viva 5

You are performing ICU outreach duties when a medical emergency code is called for a 36 weeks G1P0 pregnant woman. She was having a generalised seizure.

She was recently admitted to the antenatal ward for worsening hypertension. As you arrive at the code, the seizure spontaneously ceased.

List your likely differential diagnosis.

Outline your approach to the assessment of this patient.

This viva explored the medical complications and management of a late trimester pregnant patient.

Maximum Score	7.00
Percentage Passed	81.25%

Viva 6 – Radiology Station

The radiology station consisted of 4 plain X-rays and 3 CT scans.

Maximum Score	6.40
Percentage Passed	62.5%

Viva 7 – Procedure Station

A trauma patient has been admitted to your ICU for observation. She has a moderate right sided hemopneumothorax. The trauma service has asked intensive care to insert an Intercostal Catheter (ICC).

Your trainee has asked you if they could insert the ICC.

What factors would you take into consideration to determine the level of supervision your trainee would require?

This viva explored the insertion and management of ICCs and supervision aspects of clinical leadership

Maximum Score	7.5
Percentage Passed	87.5%

Viva 8 – Communication Station

You have been contacted by the treating medical team for advice on management for a 36-year-old female, Louisa. She has severe cognitive impairment with very difficult behavioural issues, in the context of autism spectrum disorder.

She developed a PICC line related Staphyloccus epidermidis bacteraemia and the line has now been removed. The PICC line was inserted for total parenteral nutrition (TPN) due to diabetic gastroparesis.

The medical team are struggling with managing Louisa's behaviour on the ward. They have requested advice from ICU regarding management options.

You have been asked to meet with Sam, Louisa's parent, to discuss admission to ICU to facilitate ongoing treatment.

N.B.: Reminder for candidates to <u>not</u> to shake hands with the actors.

This viva focused on the shared decision-making aspect of care. Including clarity of communication and respectful collaboration.

Maximum Score	7.50
Percentage Passed	75.00%