



Australian Society of Medical Imaging and Radiation Therapy

The national professional organisation representing medical radiation practitioners

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MIAP1

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MEDICAL IMAGING ADVISORY PANEL 1

Policies & Procedures Manual

Cardiac Interventional imaging

(Angiography)

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Cardiac Interventional Imaging (Angiography)

Introduction

Diagnostic and Interventional cardiac angiography has undergone significant technique and procedural change in the last 20 years. The advancing role of radiographers in this speciality has led to the implementation of a certification programme. This ASMIRT programme aims to recognise the additional skills, training and experience radiographers possess to perform high quality angiographic examinations.

The programme, consisting of a certification exam, is aimed at a beginner angiography practitioner level and working in a cardiac angiography room. Radiographers at this level should have completed training through an official in-house training programme and are regularly rostered through Cardiac catheterisation labs.

Certification of the Cardiac Imaging Practitioner

The certification process consists of 2 components. A multiple choice question exam and practical experience component

Legislation

There is currently no legislative requirement to be registered as an Angiographic practitioner in Australia, however it is recommended that Angiographic practitioners possess a specific level of training or experience prior to operating Angiographic equipment. MIAP1 recommends that any radiographer undertaking Angiography procedures holds certification.

MIAP1

The Medical Imaging Advisory Panel 1 (MIAP1) is made up of 8 volunteers who donate their time, knowledge and experience to ASMIRT and the progression and development of medical imaging.



Certification Policies

Certification Eligibility

Level 1 Application

Certification comprises a theoretical (part A) and a clinical component (part B). Certification is valid for a 3 year period. Angiographic Certification is awarded to persons who have successfully completed part A and part B. Both part A and part B must be completed by the candidate within a 3-year period.

Part A – Theoretical Component. Is a written examination set by MIAP1, which involves a paper not exceeding 180 multiple-choice questions covering topics such as: Angiographic equipment, Angiographic anatomy, pathophysiology & pharmacology, Angiographic physics, Fundamental cardiac angiographic principles and procedures.

Part B - Practical experience component. Requires the candidate's supervisor to acknowledge experience with 150 cardiac examinations. These 150 examinations must have taken place within a 12-month period. This period must have occurred within the 3 years prior to application submission.

Experience may include all or part involvement in the following:

- Patient and/or room setup
- Opening of sterile equipment and/or consumables
- Angiographic projection positioning
- Setting/manipulating acquisition and/or injection parameters
- Peri/post procedure image processing

Procedure eligibility

Candidates of the certification process are required to document their practical experience by verifying their assistance in 150 diagnostic or interventional cardiac procedures during a 1 year period.

The following procedures **will not** be allowed:

- Diagnostic and interventional fluoroscopic procedures
- EP studies
- Ablation
- Cardiac biopsy



Table 1.Cardiac Imaging (Angiography) *Level 1 Certification Requirements.*

	Eligibility Requirements	Time to Acquire	Certification Duration	Extension
Level 1 Application	<p>Part A - Undertake Level 1 Certification Examination.</p> <p>Part B - Complete 150 clinical Cardiac angiographic examinations.</p>	<p>Part A and Part B must be completed within a 3-year period.</p> <p>Application submission must occur within 3-years of sitting Part A examination.</p>	3-year expiry for Level 1 Certification.	N/A
Level 1 Application Lapsed	If application submission does not occur within 3 years of undertaking Level 1 Certification Examination, applications must re-sit Level 1 Certification Examination.			

Level 1 Renewal

Renewal of Certification requires completion of the clinical component only. Clinical component requires the candidate's supervisor to acknowledge completion of 450 cardiac angiographic examinations. These 450 examinations must have taken place within a 3-year period. This 3-year period must have occurred immediately prior to application submission. Renewal submissions must be received by the Secretariat no later than 6 months after expiry of previous angiographic certification. If this timeline is not adhered to, Certification will be deemed as expired and participants will be required to reapply and complete both part A and part B.

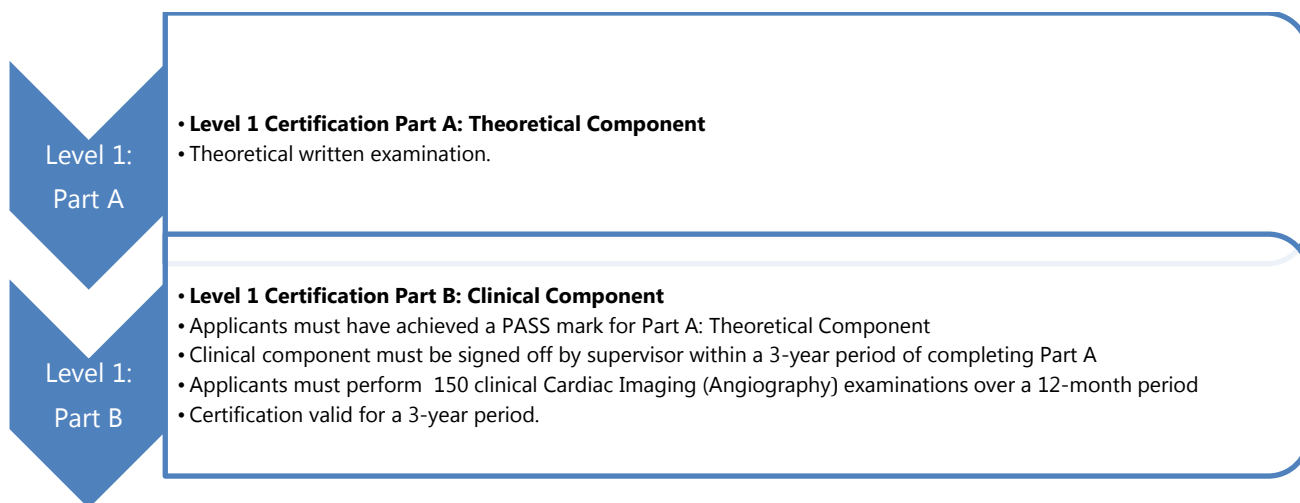
Table 2.Cardiac Angiography *Level 1 Certification Renewal Requirements.*

	Eligibility requirements	Time to acquire	Certification duration	Extension
Certification application	Complete 450 <u>cardiac angiographic</u> examinations	<p>450 examinations must be completed within a 3-year period. A Minimum of 150 clinical cardiac angiographic examinations must be completed every 12 months within this 3 year period.</p> <p>This 3-year period must have occurred immediately prior to application submission.</p>	3-year expiry for certification	n/a
Certification lapsed	If application submission does not occur within 3 years of undertaking the certification examination, applications must re-sit the examination			



Figure 1.

Process of Application for Cardiac Angiography Level 1 Certification.



Signatory on Part B of Level 1 Certification Applications

The Supervisor angiographer is defined as a practitioner who holds MRPBA registration, appropriate radiation licenses and has a minimum of 5 years' experience in medical imaging with at least 2 years of full time equivalent supervisory angiography experience. These practitioners represent the minimum standard of practitioner who is able to be the signatory for Certification applications.

Certification Length

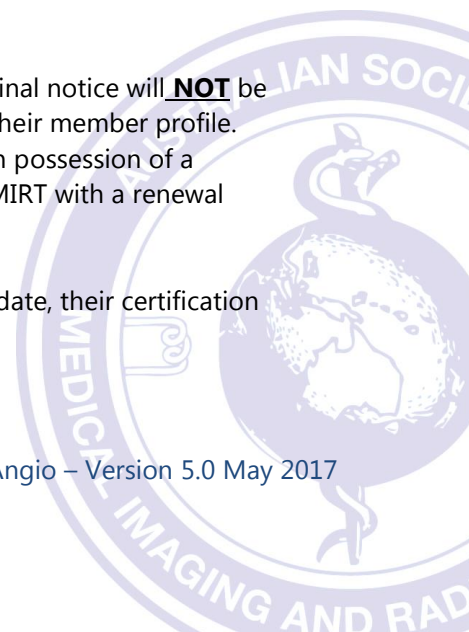
Certification certificates have a 3-year expiry from date of issue by MIAP1. Renewed certification certificates will coincide with the original date of issue and will also have a 3-year expiry. Practitioners who pass the theoretical written examination (part A) have a 3-year period to apply for their angiography Certification.

Certification Renewals

Notification of a forthcoming certification expiry will be emailed 4 months prior to the expiry date. This email will contain a link to the MIAP1 policies and procedures/renewal guidelines and application form. Renewals will only be sent to practitioners who are current financial members of ASMIRT (this includes Ordinary Members and CPD members) and is dependent on registered email address being maintained by the member.

If the practitioner fails to return the renewal application form for Certification, a final notice will **NOT** be issued. Practitioners must ensure that their details are current and up to date in their member profile. Those who are not members or enrolled in the ASMIRT's CPD program and are in possession of a current SOC with lapsed Angiography certification will **NOT** be contacted by ASMIRT with a renewal notice.

If practitioners neglect to renew their Certification within 6 months of the expiry date, their certification will be deemed lapsed by MIAP1.



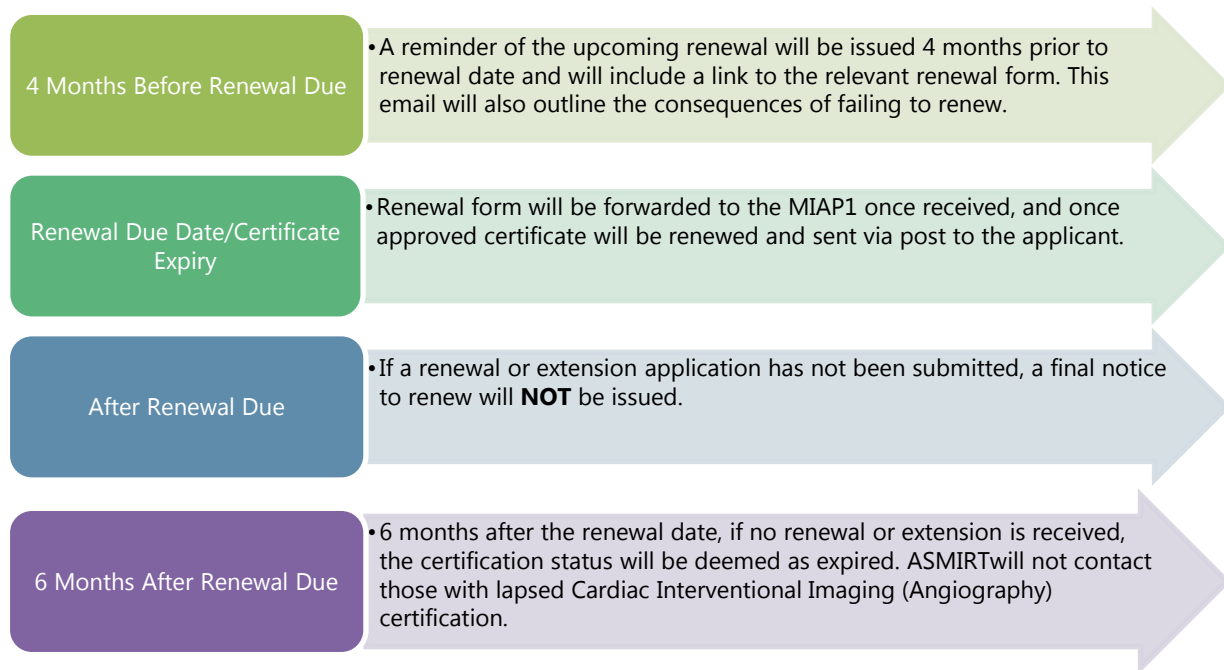
Practitioners with lapsed Certification are expected to follow the procedures outlined under Certification Eligibility. Lapsed certification cannot be re-instated without the candidate correctly following all of the outlined criteria for Certification application.

Figure 2.

Outline of the Renewal Process for Cardiac Imaging (Angiography) Level 1 Certification.

	Eligibility requirements	Time to acquire	Certification duration	Extension
Certification renewal	Complete 450 cardiac angiographic procedures	450 examinations must be completed within a 3-year period. A minimum of 150 clinical cardiac angiographic examinations must be completed every 12-months within this 3-year period. This 3-year period must have occurred immediately prior to application submission.	6-month grace period for lapsed Certification.	Apply before Certification expiry.
Renewal lapse	Re-sit certification Examination. Complete 150 cardiac angiographic procedures	Must be completed within a 3-year period.	As for certification Application.	N/A





Extensions

Practitioners who are unable to fulfil the requirements of renewing their certification before the renewal due date are able to apply for an Angiographic certification extension. Supporting documentation must be attached to the application for review by MIAP1 (Doctor’s certificates, letter from employer, Statutory Declaration etc). Extension applications will be assessed on a case-by-case basis by MIAP1. The extension period granted is at the discretion of MIAP1.



Cardiac interventional Imaging (Angiography) Level 1 Certification

Part A: Theoretical Component - Written Examination

Cardiac Imaging (Angiography) Level 1 Certification Examination

Candidates will sit a multi-choice question (MCQ) exam containing no less than 160 questions over a maximum duration of 3 hours.

Examination Breakdown

Section A - Angiographic equipment

Section B - Angiographic anatomy, pathophysiology & pharmacology

Section C - Angiographic physics

Section D - Fundamental cardiac angiographic principles

Section E (Part 1) - Fundamental cardiac angiographic procedures – Coronary/Arterial procedures

Section E (Part 2) – Fundamental cardiac angiography procedures – Electrical and structural procedures

Section F - Cardiac angiographic image labelling

The breakdown of marks is approximately:

Section A – 14%

Section B – 18%

Section C – 12%

Section D – 16%

Section E (Part 1) – 20%

Section E (Part 2) – 15%

Section F – 8%

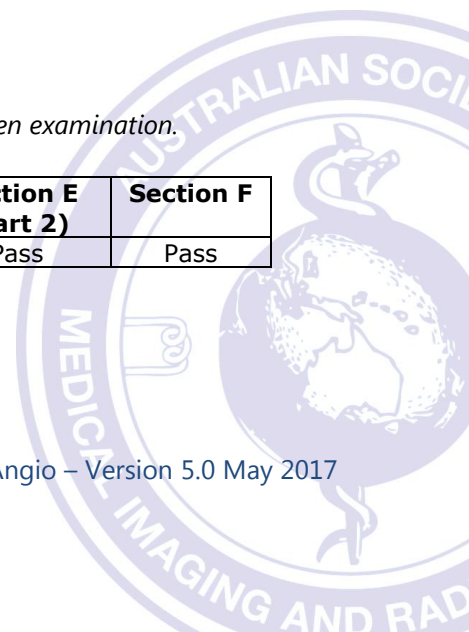
Candidates will need to achieve an overall pass mark for 75% with **no less than 65% in any 1 section**. After the conclusion of the examination, the results are tabled and reviewed by the MIAP1. Once this has undergone rigorous scrutiny, the MIAP1 sign off on the results, which are then sent back to ASMIRT. Cardiac Angiography Level 1 Certification Examination results are posted online 6 weeks post examination at <http://www.asmirt.org/angiography.php> , listing candidates who have passed. Results are listed using the unique Candidate ID number, which is issued to all registered candidates.

Letter correspondence outlining pass or fail result is sent to all candidates who have sat the examination. Candidates who fail receive a breakdown of their results for each section presented in the following form (see Table 1)

Table 1.

Example of results breakdown provided to candidates who fail the theoretical written examination.

Section A	Section B	Section C	Section D	Section E (part 1)	Section E (part 2)	Section F
Pass	Fail	Fail	Pass	Pass	Pass	Pass



Angiography certification examinations are on a first come, first serve basis. Selected examination venues hold a maximum capacity which varies from state to state. Therefore once the maximum capacity has been reached applicants will go onto a waitlist.

We recommend that to avoid disappointment, individuals send in their applications early if they intend on sitting the examinations on the advertised dates. Please note that no applications will be accepted once the application closing date has passed.

The theoretical written examination is currently held twice a year in each state. Practitioners who live at a distance greater than 150km from the hosting city may request to sit the exam under the supervision of an independent person acceptable to the ASMIRT (see Supervisor's Declaration Form at <http://www.asmirt.org/angiography.php>)

Examination Supervisor

Examination Supervisors must hold employment from an approved occupational group (e.g. the occupational groups approved to endorse Australian passport photographs). Supervisors should not have any direct professional or personal relationship with the candidate. Where possible they should not be their direct supervisor. They must not be related to the candidate by birth, marriage, de facto or same sex relationship, nor live at the candidate's address. The Examination Supervisor must be approved by ASMIRT. Examination supervisors must sign the supervisor's declaration form acknowledging commitment to upholding the integrity of the examination process.

Candidates who live at a distance greater than 150km from the hosting city may request to sit the examination at their own location. Candidates will be required to submit an application form to the ASMIRT Secretariat and a supervisor will be nominated for them. If an ASMIRT nominated supervisor is not available, the candidate will be contacted for suggested names of supervisors. ASMIRT will review the suggested names and select an appropriate independent person acceptable to ASMIRT for supervision purposes.

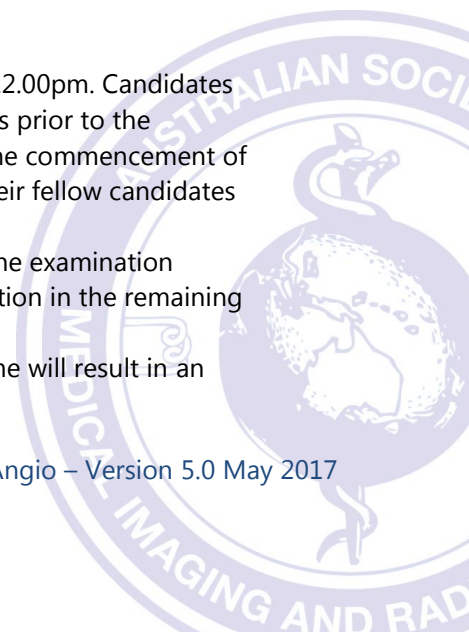
By signing the supervisor's declaration, examiners are agreeing to ensure that the examinations are conducted fairly, ethically and professionally. It is an expectation that as a supervisor, these principles are upheld and the integrity of the certification examinations are maintained.

Examination Venues

Examination venues must be an officially sanctioned venue eg. a workplace under the direct supervision of an examination supervisor. Supervisors are required to closely supervise candidates and be present in the examination room whilst the examination is in progress.

Examination Procedures

1. Examinations are scheduled for a 3-hour period from 9.00am – 12.00pm. Candidates are asked to arrive at their examination venue at least 15 minutes prior to the examination start time to ensure that they are present prior to the commencement of the examination. Candidates are reminded to be cognisant of their fellow candidates sitting this examination.
2. Late arrivals – if candidates arrive within the first 30 minutes of the examination commencement, they will be permitted to continue the examination in the remaining time.
3. Arrivals post - 30 minutes of the advertised examination start time will result in an ineligibility to sit the examination.



4. Candidates are required to bring a form of photo ID and their allocated unique candidate ID number to the examination.
5. No reading material is permitted in the examination room.
6. All notes, booklets and answer sheets are not to be brought into the examination room.
7. Candidates are to exit the examination room as quietly as possible so as not to disturb fellow candidates.
8. Bring a soft lead pencil with spares, eraser and pencil sharpener to the examination.
9. Multiple-choice questions – responses are to be marked on the Response Bubble Sheet provided by the exam supervisor. Responses to be recorded as per the following examples:

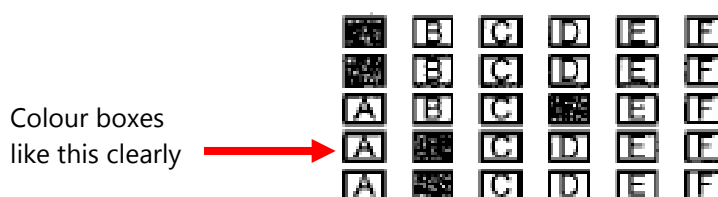
1.

A	B	C	■	E	F
---	---	---	---	---	---
2.

A	■	C	D	E	F
---	---	---	---	---	---

It is of vital importance that the boxes are clearly marked across the entire box.

Examples from exams:

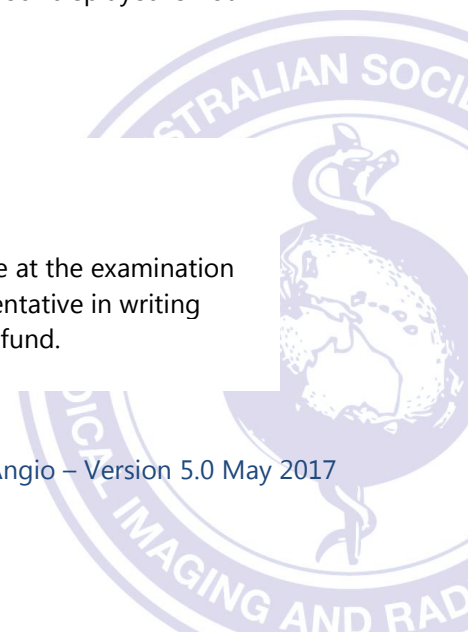


10. The above effect can be achieved by using a dark, soft pencil (2B or HB). If candidates are using an eraser to correct an answer, they must ensure that the correct answer is clear and defined.
11. Pens or other permanent markers are not to be used on the Response Bubble Sheet – candidates must be able to modify their responses, if they need to, prior to the end of the examination.
12. Candidates may be escorted out of the examination if the behaviour displayed is not conducive to the professional conduct of the examination.

Special Consideration

On the day of the examination

If a candidate experiences extenuating circumstances preventing their attendance at the examination venue, including illness, they should contact ASMIRT or their state MIAP1 representative in writing within 2 working days of the examination. Candidates may be considered for a refund.



Supporting documentation

Candidates will need to provide one or more of the following documents to support their application for refund consideration:

- Medical certificate or letter from a medical professional
- Death notice or certificate and evidence of relationship
- Police report
- Statutory declarations from employer or relevant people
- Notification from:
 - Defence services
 - Juries Commissioner's Office
 - Emergency service organisations such as the Country Fire Authority
- Medical/professional certificates must state that candidates were unfit to sit the examination or complete work for assessment **on or before** the relevant date, and cannot be signed by a member of the candidate's family.



Certification Procedures

Assessments

Level 1 Certification applications and renewal applications are received by the Secretariat and forwarded to the MIAP1 Chair for assessment. This process can take up to 8 weeks from the date that the Secretariat receives a practitioner's application. A Level 1 application will be dated from the date that the application was approved by the MIAP1 Chair.

Applications will be dated from the original date that the application was approved by the MIAP1 Chair.

Incorrect Applications

Practitioners who provide incorrect information on any application form will be emailed and / or have their application returned to them with notification querying the information provided and a list of information that needs to be reviewed by the practitioner and the Supervisor.

Extension Applications

Applications for extensions are received by the Secretariat and forwarded to the MIAP1 Chair for review and assessment. This process can take up to 6 weeks and practitioners will be notified by email of the outcome, and extension time granted if applicable. Current Application Forms Practitioners must ensure that current application forms are submitted to ASMIRT, or applications will not be accepted.

Current Application Forms

Practitioners must ensure that current application forms are submitted to the ASMIRT, or applications will not be accepted.



Suggested Reading

Basics of Angiography

Interventional Radiology: A survival Guide, 3rd Edition, Kessel and Robertson, 2012

Handbook of radiologic procedures, 4th edition, Kandarpa and Machan, 2012

Anatomy

Atlas of Vascular anatomy: an angiographic approach, 2nd edition, Uflacker, 2007

Cardiac angiography

https://books.google.com.au/books?id=r0cE-S10SKMC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

Cardiac angiography projections

Coronary angiography in the angioplasty era: projections with a meaning. Carlo Di Mario, Nilesh Sutaria
Heart 2005;91:968–976. doi: 10.1136/hrt.2005.063107

Other Materials

Any other source material can suffice however the information must be general in its applications to angiography. Doctor, practice and site specific methods may be too narrow in their applications and should be avoided. Site specific practices are not being examined, only the fundamental angiography methodologies (which apply across all sites).



Sample Questions

1. Using radial arterial access for a coronary angiogram leads to higher patient radiation doses. Why:

- a.) More acquisitions of the contrary arteries are required
- b.) Radial artery catheters are smaller, therefore acquisitions are longer
- c.) The anatomy from the radial artery to the aorta is often more tortuous requiring more fluoroscopy to visualise
- d.) Initial cannulation of the radial artery can take considerably longer time than femoral access

The correct answer is c.

2. The pressure limit on a power injector exists:

- a.) To increase the duration of a procedure
- b.) To protect the patient, catheter and injector from extreme pressure increases
- c.) To prevent the use of extremely low pressures
- d.) To stabilize the injection pressure

The correct answer is b.

3. A positive D-Dimer test indicates:

- a.) Probable myocardial infarction
- b.) No myocardial infarction
- c.) No PE or DVT
- d.) Probable PE or DVT

The correct answer is d.

4 List the ideal projection for demonstrating the left common femoral bifurcation.

- a.) LAO 10
- b.) LAO 30
- c.) RAO 30
- d.) RAO 10

The correct answer is b.

5 The severity of an atrial septal defect can be determined by:

- a.) Taking a series of oxygen saturations from different areas of the right heart
- b.) Taking a series of oxygen saturation from different areas of the left heart
- c.) Performing a right ventriculogram
- d.) Performing a left ventriculogram

The correct answer is a.



6 Which projection is normally used to traverse a catheter through the chambers of the right heart to the pulmonary arteries:

- a.) Left anterior Oblique
- b.) Right anterior oblique
- c.) Posterior anterior projection
- d.) Lateral projection

The correct answer is c.

7 How would a catheter be able to travel directly from the right atrium to the left atrium:

- a.) Through a patent Foramen ovale
- b.) Through a trans septal puncture
- c.) Through an Atrial Septal Defect
- d.) All of the above

The correct answer is d.



FAQ's

Do I have to sit the Angiography Certification Examination to work as an angiography radiographer in Australia?

No, however passing the examination and being part of the ASMIRT Level 1 Angiography Certification Program is an indication of your knowledge and commitment to your speciality within the Medical Imaging profession. There are some departments and practices which require Level 1 Certification prior to employment. This Certification is not a qualification like a Master's degree which has no clinical requirement, but rather a program that ensures a level of knowledge that is measurable and common across Australia.

How much study do I have to do to pass the examination?

The examination is designed to test your clinical and academic ability. It is an indication of a knowledge base when measured against your colleagues. A study approach similar to any advanced program is suggested.

Do I have to join the 3-year Certification Program?

No, this is not a requirement as you may decide that passing the examination is adequate to demonstrate your abilities. There is however a limited time after passing the examination to join the program. If you choose not to join the Certification Program within the 3-year time period and change your mind down the track, you may be required to re-sit the Level 1 examination again.

What are examples of cardiac procedures that would count towards the 150 clinical examinations required for Part B practical experience component?

- Pacemaker insertion involving the injection of contrast and the acquisition of a run (whether that be DSA or unsubtracted angiography)
- Diagnostic coronary angiography
- Interventional coronary angiography (angioplasty, stenting, rotorblator, chronic total occlusion, thrombectomy)
- Tavi workup
- Tavi insertion
- Balloon Valvuloplasty
- Atrial appendage occlusion
- Ductus arteriosus closure
- Patent foramen ovale closure
- Closure of a coronary artery fistula

