AUSTRALIAN INSTITUTE OF MEDICAL AND CLINICAL SCIENTISTS

AIMS Membership Single Discipline Examination - Transfusion Science

Guide to Study & Suggested Reading List

Areas of knowledge expected from candidates:

For candidates sitting the general examination, the level of knowledge required is at the basic introductory level, but for those sitting only the discipline specific examination a more extensive level is required.

- An understanding of patient identification, pre-analytical, analytical and post-analytical variables and blood sample requirements.
- An understanding of ABO and Rh blood group systems including ABO variants and Rh variants including laboratory investigation.
- Knowledge on haemagglutination reactions.
- Knowledge of the clinical significance of antigens and antibodies.
- Knowledge of antibody investigations and providing compatible blood for transfusion.
- An understanding of Kell, Kidd, Duffy, MNSs, P, Ii and Lewis blood group systems and their laboratory investigation.
- Knowledge of ISBT requirements for new blood group systems and antigens.
- Knowledge of patient blood management and haemovigilance programs.
- An understanding of Quality Control, Quality Assurance and total quality management in the blood bank.
- Knowledge of investigation of haemolytic transfusion reactions.
- Knowledge of investigation of haemolytic disease of the foetus and newborn.
- Knowledge of investigation of cold and warm auto immune haemolytic anaemias.
- An understanding on the application of molecular genotyping in blood banking.
- Knowledge of the principles of column agglutination technology versus solid phase technology.
- Knowledge on the use of automation in blood banking.
- Knowledge on enzyme, indirect antiglobulin technique, direct antiglobulin technique, IS saline technique, 37°C saline technique, PEG-IAT technique, DTT treatment, absorption and elution techniques.
- Knowledge on blood donor selection, processing and testing by ARCBS.
- Knowledge on pathogen reduction strategies for blood and blood products.
- Knowledge on low and high frequency red cell antigens and laboratory investigation of antibodies.
- Knowledge of storage, handling and transport of blood and blood products.
- An understanding of massive transfusion protocol and pathophysiology of blood loss.

Recommended Reading

- Harmening D (2018) *Modern Blood Banking & Transfusion Practices, 7th edn*, FA Davis Company.
- Cohn CS, Delaney M, Johnson ST and Katz LM (2020) *American Association of Blood Banks Technical Manual, 20th edn*, AABB
- Overfield J, Dawson M and Hamer D (2007) *Transfusion Science, 2nd edn*, Scion Publishing.
- Daniels G and Bromilow I (2013) *Essential Guide to Blood Groups, 3rd edn*, Wiley.
- Murphy MF, Pamphilon DH and Heddle NM (2013) *Practical Transfusion Medicine, 4th edn*, Wiley.

Links:

- Australian Red Cross Lifeblood https://www.lifeblood.com.au/health-professionals/clinical-practice/transfusion-process
- ANZSBT Guidelines for Transfusion and Immunohaematology Laboratory Practice, 1st edn, 2020 (can be downloaded from https://anzsbt.org.au (free))

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Sample Examination Questions

ESSAY QUESTION

(30 minutes per essay question)

Molecular genotyping in conjunction with serological testing has provided valuable information in resolving blood transfusion discrepancies. Discuss the application of molecular genotyping for a blood donor or transfusion recipient from a blood donor centre perspective, reference laboratory and transfusion service.

SHORT ANSWER QUESTIONS

(Approximately 4 minutes per question)

1. Provide three (3) examples, with explanations, of physiological or pathological conditions where a patient's ABO blood type will appear aberrant (e.g., disagreeing forward and reverse typing).
2. Once tested, an antibody screen has an expiry/validity date, e.g., 72 hours. Why is there an expiry date on these tests?
3. How is a direct antiglobulin test (DAT/Coombs test) performed and what does it detect?
4. A patient is A Rh(D) positive, and has a history of anti-K. Given the following red cell inventory, which donor unit should you select for cross matching for this patient? Select, and then explain your answer.
   - Group A Rh(D) negative, K-k+
   - Group O Rh(D) positive, K+k-
   - Group O Rh(D) negative, K+k+
   - Group AB Rh(D) positive, K-k-
   - Group AB Rh(D) positive, K-k-
5. What is meant by the term 'dosage' in the context of pre-transfusion testing? Describe how this would appear in an antibody screen and antibody identification panel (extended screening panel).
6. Provide two possible reasons to explain the scenario of an antibody screen result being negative, yet the crossmatch is positive.