

**GUIDELINES AND STUDY GUIDE
FOR THE AIMS
PROFESSIONAL EXAMINATION**

General

The AIMS Professional Examination will be held in centres in Australia and other countries twice yearly, in March and September.

The examination is a three (3) hour short answer paper and is set at the level expected of a professional medical scientist with at least two years post graduate experience. All questions must be attempted.

The examination is divided into five sections:

Clinical Chemistry	22 marks
Haematology	22 marks
Medical Microbiology	22 marks
Transfusion Science	22 marks
Histopathology/Cytology	12 marks
Total	100 marks.

To pass this examination, candidates must obtain a total of 50%, with a pass of at least 40% in each section.

If you wish to sit for the examination, please complete the attached examination form, and return it to this office, together with a signed photograph of yourself and the required fee, **no later than 20 June** for the September examination and **20 December** for the March examination.

Late applications will not be accepted.

The major areas of knowledge expected of candidates are as follows:

Clinical Chemistry

Ability to carry out tests and understand the significance for the following:

Blood gas and electrolytes measurement.

Urea, creatinine, and creatinine clearance, uric acid.

Glucose, glucose tolerance, HbA1c

Liver function tests

Lipid analysis

Thyroid function tests

Adrenal function tests

Plasma proteins and protein electrophoresis, alpha one-fetoprotein

Enzyme tests, e.g. amylase, creatine kinase.

Principles of enzyme assays.

Calcium, phosphates, magnesium, and albumin

Bilirubin

Myocardial function tests.

Prostatic specific antigen

Microbiology

. A basic knowledge of bacterial diseases and organisms most commonly associated with these diseases

. Collection, handling and processing of samples including the minimal criteria for acceptance of samples

. Presumptive identification of major groups of bacteria based on microscopic and colonial morphology on a variety of common media

. Knowledge of the basic identification tests e.g. ONPG, O-F, catalase, oxidase, citrate, V.P., indole, H₂S, nitrate reduction, urease etc

. Principles of major methods of susceptibility testing i.e. disc, agar dilution, methods of determining MBC MIC and quality control concepts

. Quality control of media, reagents and stains

. Microscopy:

- Function and maintenance of a modern binocular microscope

- The setting up of a microscope for bright field, phase contrast and darkfield microscopy, fluorescence

- Ability to define the terms numerical aperture, working distance, magnification, optical tube length

. Staining techniques:

- Gram stain

- Ziehl Neelsen

- Negative staining technique

- Alberts/Neisser's stain

- Modified acid fast stain

. Knowledge of Normal Flora (indigenous flora) of:

- Respiratory tract, nose, mouth, pharynx etc

- Gastrointestinal tract

- Genitourinary tract

- Skin, ear, eye

- A knowledge of sites that are normally sterile.

Haematology

. Principles of automated cell counting

. Macrocytic anaemia

. Microcytic anaemia

- . Normocytic anaemia
- . Myeloproliferative disorders
- . Lymphoproliferative disorders
- . Production of erythrocytes, leucocytes and platelets
- . Iron metabolism
- . Intrinsic and extrinsic coagulation pathways and methods of testing
- . Bleeding disorders
- . Anticoagulant therapy and methods of monitoring this therapy
- . Natural anticoagulants
- . Fibrinolysis. *I*

Immunohaematology/Transfusion Science

- . Antibody structure and function
- . Antibody production
- . Blood donation testing
- . Blood components
- . Blood group systems
- . Antibody detection and identification
- . Pre transfusion testing
- . Quality assurance in the blood bank laboratory
- . Antigen antibody interaction.

Histopathology and Cytology

- . Preparation of specimens for light microscopy including fixation, tissue processing, microtomy, decalcification technique and general staining techniques
- . Normal histology
- . Histochemical methods as applied to light microscopy such as PAS and Perls` Prussian Blue for Iron.
- . Resin embedding techniques (when they are used in preference to paraffin wax)
- . Laboratory safety
- . Fixation of cytological specimens
- . The Papanicolaou staining technique
- . The cytological features of inflammation and cellular degeneration
- . Normal cell types in cytological specimens

Laboratory Safety and Quality Control

- . Safe handling of biological specimens
- . Safe handling of hazardous chemicals
- . Sterilisation and disinfection procedures
- . Radiation safety
- . Handling of infectious specimens
- . Use of control specimens
- . Knowledge of basic statistics
- . Causes of error in laboratory analysis.

Suggested Reading List

1. Balows, Hausler, Hermann, Tsenberg and Shadomy.
Manual of Clinical Microbiology. 5th Ed. 1991. *American Society for Microbiology*.
2. Dacie and Lewis.
Practical Haematology. 6th Ed. *Churchill Livingstone*.
3. Hall and Malia.
Medical Laboratory Haematology. *Butterworths*.
4. Technical Manual. 10th Ed. *American Association of Blood Banks*.
5. Textbook of Diagnostic Cytology. *The New South Wales Institute of Technology Information and Publications unit*.
6. Grey W. Diagnostic Cytopathology. *Churchill Livingstone*.
7. Cook, D.J
Cellular Pathology 2nd Edition (2006) *Scion Publishing*
8. Difiores Atlas of Histology with functional correlations 9th Edition Editor Eroschenko, V.A
2000 *Lippincott*
9. Tietz, Saunders.
The Fundamentals of Clinical Chemistry. *Saunders*.
10. Kaplan L A, Pesce J P and Kazmierczak CK
Clinical Chemistry. *Mosby 4th Edition 2004*
11. Gaw A., Murphy, M.J., Cowan A.C., O'Reilly D, J, Stewart, M.J. Shepherd., Clinical
Biochemistry, *Churchill Livingstone*, 3rd Edition, 2004
12. Murray, P.R., Baron, E.J., Pfaller M.A., Jorgensen, J.H., and Tenover, R.H. 2003. *Manual of Clinical Microbiology 8th edition*, ASM press, American Society for Microbiology
13. Forbes, B.A., Sahm, D.F., Weissfeld, A.S., 2002, *Bailey and Scott's Diagnostic Microbiology*, 11th ed. Mosby, inc St. Louis (Good broad coverage at a basic level, lacks the depth of *Manual of Clinical Microbiology* but may be ok for graduate level)
14. Bain B. Blood Cells: *A Practical Guide* (Blackwell)
or
15. McKenzie, S.B., 2004, Clinical Laboratory Haematology. Prentice Hall New Jersey (a more basic approach to haem than Bain. Reasonable introductory book to the subject)
16. Rozenburg *Microscopic Haematology* (Martin Dunitz) (A good atlas)

17. Issitt PD, Anstee DJ., *Applied Blood Group Serology*. Montgomery Scientific Publications 4th Edition 1998
18. *Technical Manual*, American Association of Blood banks 14th Edition 2002
19. *Guidelines for Pretransfusion Testing*. Australian & New Zealand Society of Blood Transfusion 4th Edition 2002
20. Bancroft, J.D; Gamble, M, *Theory and Practice of Histological Techniques*. Churchill Livingstone, 5th Edition, 2002. ISBN 0-443-06435-0.

Useful websites for histology and histopathology

<http://www.udel.edu/biology/Wags/histopage/colorpage//colorpage.htm>

<http://www-medlib.med.utah.edu/WebPath/webpath.html>