Australian Institute of
Medical and Clinical Scientists (AIMS)

FELLOWSHIP EXAMINATION example

Name:

Candidate No:

Anatomical Pathology
Sample exam questions
Module I, II, III, IV and V

INSTRUCTIONS TO CANDIDATE

Time allowed is three (3) hours

Answers should be written in the answer book provided, writing on the right-hand page only leaving the margin blank. The facing page may be used for rough work if desired

The examination consists of:

- 2 essay style questions; each question is worth 35 marks.
  (Allow approximately 30 mins each)
- 20 short answer questions; each question is worth 5 marks.

Time allowed for writing is three (3) hours. There is an additional initial reading time of 15 minutes during which notes only may be written on the examination paper but no writing in the examination answer books is permitted at this time.
Candidates may attempt either the essay questions or the short answer questions first.

No papers or books of any kind may be taken into the examination room. No electronic devices of any type* are to be taken in to or accessed in the examination room. A non-programmable calculator only is permitted.

*This includes, but is not restricted to: phones, iPads, iPods, eBook readers, MP3 players, memory sticks (flash drives) and WiFi enabled devices of all types.

THE EXAMINATION PAPER MAY NOT BE REMOVED FROM THE EXAMINATION ROOM

ESSAY ANSWER QUESTIONS

2 Questions - each question is worth 35 marks. Time allocated to each question should not exceed 35 minutes. All questions should be attempted

Module AP I - Laboratory Histology

Essay question:

Discuss the fixation of tissues for light microscopy.
Include in your answer the chemistry of fixation, compound fixatives, advantages and disadvantages of the various fixatives and factors favouring the most effective tissue preservation. (35 marks)

Short answer questions: (5 marks each question)

1) Write brief notes on the molecular size basis for the differential staining in the Masson Trichrome stain.
2) Write brief notes on the chemistry of the Periodic Acid Schiff stain (PAS)

Module AP II - Specialised Histopathology

Essay question:

Discuss the Cluster of Differentiation (CD) classification and its importance in the histopathological diagnosis of Lymphoma. (35 marks)

Essay question:

You are establishing an immunohistochemistry section for a busy diagnostic laboratory (your budget is not restricted).
a) What essential equipment would you purchase? Briefly explain your choices.
b) List the most important primary antisera you would initially purchase. What criteria would you use to make your selection?
c) How would you test your antisera to determine the appropriate antigen retrieval techniques and working dilutions? How would you investigate their characteristic labelling patterns?
d) What essential quality control measures would you initiate?

Short answer questions: (5 marks each question):

1) How are Moll Numbers used in Immunohistochemistry?
2) What are the major factors affecting antigen retrieval effectiveness?
3) Briefly describe how demonstrating cytokeratins is useful when characterizing a tumour.
Give examples.
4) What immunohistochemical markers are normally used to identify a Merkel cell carcinoma of the skin? What are the characteristic labelling patterns?
5) The following antisera can be used to identify which tissue, tumour or cell type. Indicate in your answer the expected localization of the chromagen:
a) TTF-1;
b) p 504s;
c) WT-1;
d) MIC-2;
e) CD30;
f) PAX-8;
g) Desmin;
h) P63;
i) MUM-1;
j) HMB-45.

Module AP III - Electron Microscopy

Essay question:
Describe in detail a strategy for examining and recording the diagnostic features of a renal biopsy by Transmission Electron Microscopy (TEM) when no patient details, light microscopy or immunofluorescence results are available to you? (35 marks)

Short answer questions: (5 marks each question)
1) Briefly outline the differences between primary and secondary fixation as applied to electron Microscopy.
2) What are the causes of particle section contamination and how could you prevent it?

Module AP IV - Image Analysis and Macroscopic and Microscopic Photography

Essay question: (35 marks)
Discuss the applications of morphometric analysis including digital image analysis in the histopathology laboratory (both routine and research)

Short answer questions: (5 marks per question)
1) Define a) photomicrography
b) microphotography
2) List four (4) common faults in photomicrography resulting in inadequate photographs.

Module AP V - Molecular Biology

Essay question: (35 marks)
Describe how DNA and RNA can be extracted from routine formalin fixed, paraffin embedded tissue for use in subsequent molecular techniques. How does routine histological fixation, processing and section preparation affect the retention, removal and quality of these molecules and what suggestions can you make to improve the process?

Short answer questions: (5 marks per question)
1) Describe the controls that can be used in the ISH (In–Situ Hybridization) technique.
2) How are PCR primers validated?