The Royal College of Pathologists
Pathology: the science behind the cure

Part 1 examination

Clinical Biochemistry: First paper

Tuesday 26 September 2017

Candidates must answer FOUR questions only

Time allowed: three hours

1. Outline how pre-analytical factors can affect the results of clinical biochemistry tests and describe what can be done to minimise them.

2. Describe detectors available for liquid chromatography systems, giving examples to illustrate their use.

3. Discuss methods available for the measurement of lithium.

4. Discuss the clinical biochemistry of renal tubular acidosis.

5. Outline the biochemical and clinical features of congenital adrenal hyperplasia and describe the role of the laboratory in its diagnosis and management.

6. Discuss the use of biochemical markers of bone turnover in the management of osteoporosis.

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Part 1 examination

Clinical Biochemistry: First paper

Tuesday 21 March 2017

Candidates must answer FOUR questions ONLY

Time allowed: Three hours

1. The blood gas analysers in a large District General Hospital need replacement. Describe the factors you would consider when writing a specification and reviewing tenders for their replacement.

2. Describe the components of **inductively coupled plasma mass spectrometry (ICPMS) systems. What are the benefits and problems of ICPMS as an analytical technique?**

3. **Describe methods available for measurement of potassium in biological fluids.**

4. **Discuss the mechanisms and causes of diarrhoea. How can biochemistry tests be used to assist in differentiating the cause of diarrhoea?**

5. **A 26 year old woman is noted to have a marginal elevation of both TSH (5.8 mu/lL) and free T4 (34 pmol/L) in a "routine" sample; suggest how she should be further investigated.**

6. **Discuss the modes of action of lipid lowering drugs.**

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Part 1 examination

Clinical Biochemistry: First paper

Tuesday 20 September 2016

Candidates must answer FOUR questions ONLY

Time allowed: Three hours

1. Outline the principles of quality management for a clinical biochemistry laboratory.

2. Describe methods available for assessment of free hormone concentrations.

3. Describe and critically evaluate the measurement of glycated haemoglobins.

4. Describe the mechanisms involved in the regulation of total body free water, and outline the disorders caused by defects in these mechanisms.

5. Describe how nutritional status can be assessed in both clinical and research settings.

6. An apparently healthy 40 year old woman is found to have a serum potassium concentration of 2.4mmol/L, when tested as part of a routine health check. Discuss the possible causes and suggest a logical scheme for any further investigations required.

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Part 1 examination

Clinical Biochemistry: First paper

Tuesday 22 March 2016

Candidates must answer FOUR questions ONLY

Time allowed: Three hours

1. *"The future of laboratory medicine is Genomics".* Discuss the implications of this statement for the delivery of a Clinical Biochemistry service.

2. Using examples as appropriate, describe the principles of electrochemical detectors and the use of electrodes as detectors in clinical biochemistry.

3. Describe the measurement of glycated haemoglobins.

4. Describe the regulation of the calcium concentration in plasma, and the abnormalities in this that may develop in adults.

5. Describe the investigation of hypertension in a 30-year old man.

6. Describe the causes, presentation, investigation and management of hyperammonaemia.

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Part 1 examination

Clinical Biochemistry: First paper

Tuesday 22 September 2015

Candidates must answer FOUR questions ONLY

Time allowed: Three hours

1. Define what is meant by audit. Using examples as appropriate, describe the use of audit in Clinical Biochemistry.

2. Describe the steps and reagents used in the Polymerase Chain Reaction and some of the problems that may arise. Using specific examples as appropriate, describe how this technique is applied for use in the Clinical Biochemistry laboratory.

3. Write a detailed account of the methods available for the assessment of immunoglobulin light chains in serum and urine.

4. Write an essay on the disorders associated with abnormalities in iron metabolism and how they may be investigated.

5. You are contacted about a 23-year old woman who complains of faintness and sweating attacks, which are improved by eating. Discuss the differential diagnosis, and describe and explain the advice you would give about her investigation.

6. Describe the role of bone markers in the investigation of metabolic bone disease.

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Part 1 examination

Clinical Biochemistry: First paper

Tuesday 24 March 2015

Candidates must answer FOUR questions ONLY

Time allowed: Three hours

1. It has been suggested that in general, biochemical results from your laboratory should be copied to patients. Discuss the issues surrounding this and the ways in which these may be addressed.

2. Using examples as appropriate, describe the use of enzymes as reagents in clinical biochemistry, including the advantages and disadvantages of their use.

3. Compare and contrast the methods available for measurement of cortisol in biological fluids.

4. Outline the mechanisms involved in the regulation of plasma hydrogen ion concentration, and describe the abnormalities that can affect this.

5. A 32-year old man is found, during a private health screen, to have an Alanine Aminotransferase (ALT) activity 3.1-times higher than the local upper reference limit. State a logical course of investigation for this (including non-biochemical investigations where appropriate) and explain the rationale underlying this.

6. Write a detailed description of Apolipoprotein B100 metabolism, and the ways in which this can be influenced by drug therapy.

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Part 1 examination

Clinical Biochemistry: First paper

Tuesday 23 September 2014

Candidates must answer FOUR questions ONLY

Time allowed: Three hours

1. The major Biochemistry analyser in a large District General Hospital needs replacement. Describe the factors you will consider when writing a specification and reviewing tenders for the replacement.

2. Describe the components of liquid chromatography-mass spectroscopy systems and the factors affecting their optimisation. What are the benefits and problems of liquid chromatography-mass spectroscopy as an analytical technique?

3. Write a critical discussion of the methods available for measurement of creatinine in serum.

4. Describe the aetiology, pathogenesis and biochemical investigation of malabsorption.

5. Describe the emergency biochemical investigation of a 2-day old infant with seizures.

6. Describe the aetiology, investigation and management of renal calculi.

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Part 1 examination

Clinical Biochemistry: First paper

Tuesday 25 March 2014

Candidates must answer FOUR questions ONLY

Time allowed: Three hours

1. You have been asked to develop a business case for the introduction of ketone measurement. Describe how this service could be delivered and the factors that you will consider in developing the business case.

2. Discuss the mechanisms of antibody interference in immunoassays, and the effects on reported results. What approaches can be used to detect this?

3. Write a critical account of the analytical measurement of catecholamines and their metabolites.

4. What factors may affect drug efficacy and toxicity? Using examples as appropriate, describe how the Biochemistry Laboratory can contribute towards assessing these factors.

5. How is acute kidney injury defined? Describe its biochemical identification and assessment.

6. Describe the differential diagnosis, investigation and management of a 45-year old woman with hypercalcaemia