15 - PATHOLOGY

(02) MD (Pathology) in Chemical Pathology Examination

05. December 2003 06. December 2004
07. December 2005 08. December 2006
1. Describe briefly the analytical principles for the measurement of any three of the following. (Include comments, where appropriate, on specimen collection, calibration and interfering substances).
   1.1. Serum total and conjugated bilirubin
   1.2. Serum albumin
   1.3. PO2 in arterial blood
   1.4. Serum creatinine

2. Outline the basic analytical principles of any three of the following techniques:
   2.1. Nephelometry
   2.2. Iso-electric focussing
   2.3. Osmometry
   2.4. Atomic absorption spectrophotometry

3. 3A. What factors should be considered when establishing an internal quality control program? Discuss whether an external quality control program can substitute for an internal quality control program.
1. Discuss briefly the significance and the clinical usefulness of the measurement of any three of the following:
   1.1. Alpha-fetoprotein  
   1.2. Glycosylated hemoglobin  
   1.3. Urinary hydroxy methoxymandelic acid (HMMA) or vanillyl mandelic acid (VMA)  
   1.4. C-reactive protein

2. Write short notes on any three of the following:  
   2.1. Macroamylasaemia  
   2.2. Anion gap  
   2.3. Syndrome of Inappropriate secretion of ADH  
   2.4. Creatinine clearance

3. 3A. Discuss the pathophysiological changes in chronic renal failure  
   OR  
   3B. Describe how plasma calcium is regulated. Outline a systematic approach in the investigation of a patient with hypercalcaemia.

4. 4A. Discuss the investigation of a Patient having hyperthyroidism highlighting any recent developments.  
   OR  
   4B. How would you investigate a patient suspected of having hypoglycemic attacks? How do you interpret the results of your investigations?
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (PATHOLOGY) IN CHEMICAL PATHOLOGY EXAMINATION -
JANUARY, 1997

Date: 20\textsuperscript{th} January 1997 Time: 2.00 p.m. - 5.00 p.m.

THEORY PAPER I

All Four Questions to be answered
All Questions carry equal marks.
Use a separate book for each question
Write legibly

1. Describe briefly the analytical principles for the measurement of any three of the following: (Include comments, where appropriate, on specimen collection, calibration and interfering substances)

   1.1. Serum cholesterol
   1.2. Serum creatine kinase - MB isoenzyme
   1.3. Serum calcium
   1.4. Urinary albumin

2. Write short notes on any three of the following

   2.1. Turbidimetry
   2.2. Ion-selective electrodes
   2.3. Thin layer chromatography
   2.4. Polymerase chain reaction

3. 3A. Describe and justify what biochemical tests you would offer after office hours.

    OR

3B. Describe the principles, advantages and uses of the various types of immunological assays used in a chemical pathology laboratory.

4. 4A. Describe how you would improve efficiency in a Chemical Pathology laboratory.

    OR

4B. Discuss how pre-analytical factors may affect laboratory results and their interpretation (consider factors in the patient in taking samples, transportation, etc.).
THEORY PAPER II

All Four Questions to be answered
All Questions carry equal marks.
Use a separate book for each question
Write legibly

1. Discuss briefly the clinical significance of any three of the following
   1.1 Myoglobin
   1.2 Chloride
   1.3 Porphobilinogen
   1.4 Synacthen test

2. Write short notes on any three of the following
   2.1 Dibucaine number
   2.2 Parathyroid hormone related peptide
   2.3 Beta human chorionic gonadotrophin
   2.4 Lipoprotein (a)

3. 3A. Discuss the investigation of a patient with polyuria.

   OR

   3B. Discuss how the laboratory can help in the diagnosis and management of a 35 year old man with hypertension.

4. 4A. Discuss the biochemical markers of bone metabolism and their potential use in the assessment patients with metabolic bone disease.

   OR

   4B. Describe and explain the metabolic consequences of prolonged vomiting.
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (PATHOLOGY) CHEMICAL PATHOLOGY EXAMINATION -
NOVEMBER, 1998

Date: 16th November 1998          Time: 2.00 p.m. - 5.00 p.m.

THEORY PAPER I

All Four Questions to be answered
All Questions carry equal marks.
Use a separate book for each question
Write legibly

1. Describe briefly the analytical principles of any three of the following:

   1.1. Serum amylase
   1.2. Serum cholesterol
   1.3. Urinary protein
   1.4. Serum urea

2. Write short notes on any three of the following

   2.1. Extinction coefficient
   2.2. High dose hook effect
   2.3. Receiver operator characteristic curves
   2.4. Kinetic enzyme analysis

3. Discuss how you would proceed to establish the reference range for a given analyte in plasma or serum. What factors may influence the range?

   OR

   Discuss how drugs may affect the investigations done in a chemical pathology laboratory.

4. You are asked to design a new request form(s) to be used for biochemical investigations. I
   Discuss the factors you would include in such a form(s).

   OR

   Discuss what factors should be taken into consideration to ensure laboratory safety in a chemical pathology laboratory.
THEORY PAPER II

All Four Questions to be answered
All Questions carry equal marks.
Use a separate book for each question
Write legibly

1. Discuss briefly the clinical significance of any three of the following

   1.1. Prolactin
   1.2. Alpha foetoprotein
   1.3. Alkaline phosphatase
   1.4. Serum sodium

2. Write short notes on any three of the following

   2.1. Von Girke's disease
   2.2. Biochemical assessment of iron status
   2.3. Cryoglobulins
   2.4. Renal tubular acidosis

3. Discuss the role played by the chemical pathology laboratory in the management of a 75 year old man diagnosed to have a malignant disease

   OR

   Discuss the biochemical monitoring of a patient with diabetes mellitus.

4. How would you investigate a patient with nephrolithiasis?

   OR

   Write a critical account on the biochemical diagnosis of a acute myocardial infarction.
1. Each of the following analytes may be measured by more than one method. Describe briefly the analytical principles of two methods for the measurement of any three of the following:

   1.1. Serum glucose
   1.2. Serum urate
   1.3. Serum magnesium
   1.4. Serum chloride

2. Write short notes on any three of the following

   2.1. The use of restriction endonucleases in mutation detection
   2.2. The use of the electrodes for measurement pH, PO2 and PCO2
   2.3. The use of amine buffers in measurement of serum alkaline phosphatase
   2.4. The advantages and disadvantages of measurement of a 24 hour urine analyte excretion versus a random urine analyte/creatinine ratio.

3. 3.A Discuss "near patient testing" ("point of care testing") analysis. What role should the Chemical Pathology Department play in its use in a hospital.

   OR

   3.B. Your chemical Pathology Laboratory has purchased fully automated clinical chemical analyzers. As Chemical Pathologist, discuss how you would manage the transition from manual to automated technology.
4.

4.A. Outline the principles of electrophoresis and isoelectric focussing and discuss their applications in the Chemical Pathology Laboratory.

OR

4.B. Write short notes on each of the following

4.B.1. Provision of suitable water for the Chemical Pathology Laboratory.

4.B.2. Provision of a steady, uninterrupted power supply for the Chemical Pathology Laboratory (electronic details are not needed).

4.B.3 Give indications for the use of different grades of solvent and discuss the disposal of used solvents.
1. Discuss briefly the clinical significances of the measurement of any three of the following,

1.1. Urine albumin
1.2. Plasma parathormone
1.3. Serum gamma glutamyl transferase
1.4. Plasma homocysteine

2. Write short notes on any three of the following.

2.1. Sick euthyroid syndrome
2.2. Syndrome of inappropriate anti diuretic hormone secretion
2.3. Alpha-1 antitrypsin deficiency
2.4. Tumor lysis syndrome

3. 3.A. There has been a great deal of discussion in the recent literature of investigation and management of patients with chest pain in emergency medical care units. Discuss the role of the Chemical Pathology Department in diagnosis and management of such patients in emergency units.

OR

3.B. Diagnostic criteria for diabetes mellitus have been changed recently. What are these changes and what is their likely diagnostic impact? What events prior to or during an oral glucose tolerance test may affect its results?
4.  

4.A. A sixty-year-old male presents with back pain. Serum calcium is found to be 3.90 mmol/L. Discuss the differential diagnosis. How can the Chemical Pathology Department help with establishing the definitive diagnosis?  

OR  

4.B. A forty year old man had been taking traditional medicine for diarrhea. The diarrhea improved but his condition deteriorated and he became weak and anemic. A blood film showed stippling of red cells. What is a likely diagnosis? How may the Chemical Pathology Department aid the establishment of a definitive diagnosis?
THEORY PAPER I

All Four Questions to be answered
All Questions carry equal marks.
Use a separate book for each question
Write legibly

1. Summarise the analytical principles for the measurement for any three of the following. Where appropriate, include comments on specimen collection, calibration and interfering substances.

1.1. Creatinine in plasma
1.2. Occult blood in faeces
1.3. Sodium in plasma
1.4. Ketone bodies in urine

2. Write short notes on any three of the following.

2.1. Osmometry
2.2. Polymerase chain reaction
2.3. Nephelometry
2.4. Chemiluminescence immunoassay

3. EITHER

A. Discuss the factors that you would take into account in introducing a new method for an analyte that is already part of the repertoire of a chemical pathology laboratory.

OR

B. Discuss how you would set up an out of hours' chemical pathology service in a new building being constructed in an existing general hospital.
4. EITHER

A. Discuss the consequences for the staff of introducing automated equipment into a chemical pathology laboratory.

OR

B. A complaint has been received from the physician in charge of the Diabetic Clinic in a Base Hospital, stating that the plasma glucose values issued from the laboratory are inaccurately low. As the Head of the laboratory, how would you investigate and respond to this complaint?
1. Summarise the clinical importance of the measurement of any three of the following

1.1 Troponin I
1.2 Insulin-like growth factor 1 (Somatomedin C)
1.3 Free PSA (Prostate specific antigen)
1.4 Ferritin

2. Describe the physiological basis of any three of the following tests.

2.1 Short ACTH (Synacthen) stimulation test
2.2 Water deprivation test
2.3 Urinary acidification test
2.4 Lactose tolerance test

3. How may biochemical investigations assist in the diagnosis of an adult presenting with acute abdominal pain?

OR

How can biochemical investigations assist in the management of adult patients admitted to hospital unconscious for no obvious reason?
4. What are the mechanisms that can lead to the development of severe hyponatraemia (plasma [Na+] < 120 mmol/l)? How should patients with this condition be investigated?

OR

Discuss the biochemical investigation of a child of eight years of age, with short stature.
1. Give the analytical principles for the measurement for any three of the following. Where appropriate, include comments on specimen collection, calibration and interfering substances.

1.1 Serum uric acid
1.2 Urinary protein
1.3 Serum total calcium
1.4 Glycated haemoglobin

2. Write short notes on any three of the following.

2.1 Turbidimetry
2.2 Immuno radiometric assay
2.3 Isoelectric focusing
2.4 Real time polymerase chain reaction (RT - PCR)

3. Either

A complaint has been received from the paediatrician, stating that the serum bilirubin values are inaccurate over the past few months. Describe in detail how you would investigate and correct this problem.

OR

Describe how you would set up and run a national external quality assessment programme for thyroid function tests.
4. Either

Describe the principles and the applications of photometry in a Chemical Pathology laboratory.

OR

Discuss how you would proceed to establish the reference range for given analyte in plasma or serum.
What factors may influence the reference range?
THEORY PAPER II

1. Give the clinical importance of the measurement of any three of the following.

   1.1 C-reactive protein
   1.2 Lipoprotein (a)
   1.3 Sex hormone binding globulin
   1.4 Urinary osmolality

2. Write short notes on any three of the following.

   2.1 Paracetamol poisoning
   2.2 Rhabdomyolysis
   2.3 Metabolic syndrome (Syndrome X)
   2.4 Renal tubular acidosis

3. Outline the endocrine disorders, which may present as medical emergencies. Which assay services should be available urgently for such emergencies?

OR

A 40 year old man has a blood pressure of 180/110 and his serum potassium is 2.8 mmol/L. Discuss the differential diagnosis and describe further investigation of the patient.
4. Discuss the role of tumour markers in the diagnosis and management of disorders of
   a) thyroid
   b) prostate

OR

Discuss critically the assessment of the glomerular filtration rate in clinical practice.
THEORY PAPER I

1. Describe the analytical principle of one method for the measurement of any three of the following. Where appropriate, include comments on specimen collection, calibration and interfering substances.

   1.1 Serum magnesium  
   1.2 Plasma glucose  
   1.3 Partial pressure of oxygen in arterial blood  
   1.4 Cortisol in serum

2. Write short notes on any three of the following.

   2.1 Osmometry using freezing point measurement  
   2.2 Fluorescence polarization immunoassay  
   2.3 Gel electrophoresis  
   2.4 Restriction fragment length polymorphism

3. EITHER

   Describe the factors you would need to consider for instituting an internal quality control programme in a chemical pathology laboratory.

   OR

   Outline the selection criteria you would apply when deciding to purchase a piece of new equipment for your laboratory. Illustrate your answer using an automated chemistry analyzer as an example.
4. EITHER

The WHO has predicted an increase in the incidence of diabetes mellitus in South East Asia. Discuss the implications of this for the provision of chemical pathology services in Sri Lanka.

OR

Discuss the analytical principles, advantages and disadvantages of near-patient biochemical testing.
THEORY PAPER II

All Four Questions to be answered
All Questions carry equal marks.
Use a separate book for each question
Write legibly

1. Give the clinical importance of the measurement of any three of the following.
   1.1 Alkaline phosphatase
   1.2 Ghrelin
   1.3 HDL cholesterol
   1.4 Carcinoembryonic antigen (CEA)

2. Write short notes on any three of the following.
   2.1 Lead poisoning
   2.2 Galactosaemia
   2.3 Malignant hyperthermia
   2.4 Pseudohyponatremia

3. EITHER
   Discuss the pathogenesis, biochemical monitoring and management of osteoporosis in an adult.
   OR
   Discuss the role of biochemical investigations in the diagnosis and management of suspected acute myocardial infarction.
4. EITHER

Give an account of diseases caused by end organ resistance.

OR

Discuss the biochemical investigation of an adult presenting with clinical features of chronic liver disease.
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (PATHOLOGY) CHEMICAL PATHOLOGY EXAMINATION
DECEMBER, 2006

Date: 5th December, 2006                      Time: 1.00 p.m.- 4.00 p.m.

THEORY PAPER I

All Four Questions to be answered
All Questions carry equal marks.
Use a separate book for each question
Write legibly

1. Describe the analytical principle of one method for the measurement of any three of the following. Where appropriate, include comments on specimen collection, calibration and interfering substances.

   1.1 Serum Creatinine
   1.2 Serum Calcium
   1.3 Urinary Protein
   1.4 Serum Creatine kinase – MB isoenzyme

2. Write short notes on any three of the following.

   2.1 Receiver-operator characteristic curves
   2.2 Molar absorptivity
   2.3 Thin-layer chromatography
   2.4 Enzyme Multiplied Immunoassay

3. Discuss the steps you would take before you introduce a new test into the laboratory.

   OR

   Describe the audit cycle.
   Discuss with examples the role of audit in improvement of the quality of chemical pathology services.
4. Discuss the method for the assessment of free hormones.

OR

Give a critical account of the methods available for the measurement of low density lipoprotein cholesterol in serum.
1. Give the clinical importance of the measurement of any three of the following:
   1.1 Serum osmolality
   1.2 Human chorionic gonadotrophin
   1.3 Serum transferring saturation
   1.4 Homocysteine

2. Write short notes on any three of the following.
   2.1 Monoclonal gammopathy of unknown significance
   2.2 Non-alcoholic steatohepatitis
   2.3 Fanconi Syndrome
   2.4 Organophosphate poisoning

3. A one-month-old baby was transferred to a paediatric hospital for further management of recurrent convulsions. The baby’s random plasma glucose was 1.7 mmol/L.

   Discuss the differential diagnosis. How can the chemical pathology laboratory help to establish the definitive diagnosis?

   OR

   A 64-year-old female was transferred to a tertiary care hospital with a serum sodium level of 115 mmol/L.
   Discuss the differential diagnosis and the role played by the chemical pathology laboratory in the management of this patient.
4. Critically discuss the chemical pathology services that should be available for the investigation of patients with subfertility and the management of treatment options offered to them.

OR

Discuss the methods for the assessment of nutritional status.