

POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

Selection Examination for Enrolment to the in-service Training Programme
in Postgraduate Certificate in Basic Laboratory Sciences leading to the
Postgraduate Diploma in Histopathology, Clinical Haematology and Chemical
Pathology – September 2015

Date :- 29th September 2015

Time :- 1.00 p.m. – 3.00 p.m.

ESSAY PAPER

Answer all questions.

Answer each question in a separate book.

All questions carry equal marks.

PART A

ANATOMICAL PATHOLOGY (GENERAL & SYSTEMIC)

1.

1.1. A 78 year old woman presents with a forearm lump. She has noticed it over the last 3-4 months, and it is now about 3 cm in diameter. It is focally ulcerated, but did not give discomfort before ulceration. She vaguely recalls itching of that area a few months ago.

1.1.1. List two (02) possible pathological processes that can give rise to this lesion. (10 marks)

1.1.2. List the tests that could be done, from first line to final, where samples are sent to the histopathology lab, to diagnose this lump. Include a brief description of specimen transport and fixatives used, and stains performed for the tests you mentioned. (30 marks)

1.1.3. She was also found to have axillary lymph node enlargement on that side. Enumerate possible reasons for this. (15 marks)

Contd.../2-

1.2. A 30 year old woman was identified to have a blood pressure of 200/120mmHg. The echocardiogram showed hypertrophy of the left ventricular wall.

1.2.1. Describe the pathophysiological mechanism of left ventricular hypertrophy in this patient. (10 marks)

She defaulted the treatment and presented two years later with angina pectoris.

1.2.2. Describe the pathophysiological basis of angina in this patient. (10 marks)

At the age of 38 years she developed a myocardial infarction.

1.2.3. Briefly describe the light microscopic changes that you will observe in the necrotic cardiac myocyte. (10 marks)

1.2.4. Thrombolytic therapy was administered to restore the coronary blood flow. In spite of this therapy, the degree of myocardial injury increased. Outline the pathophysiological basis of this injury. (15 marks)

2.

2.1. A 20 year old boy was brought to the clinic with generalized body swelling of 3 days duration. Urine analysis showed heavy proteinuria. 24 hour urine protein excretion was 4g.

2.1.1. Outline the pathophysiological basis of generalized oedema formation in this patient. (15 marks)

2.1.2. Describe the possible light microscopic changes seen in a renal biopsy of this patient. (40 marks)

2.1.3. List two (02) special investigations done on renal biopsy which will be useful in diagnosis. (05 marks)

2.2. A 60 year old male presenting with dysphagia is found to have an ulcerating carcinoma of the lower oesophagus.

2.2.1. Describe the possible histological features of the above lesion. (30 marks)

2.2.2. Name four (04) prognostic features detected by the histopathologist which would affect the outcome. (10 marks)

PART B
HAEMATOLOGY

3.

3.1. A 50 year old man was seen at the haematology clinic. His full blood count (FBC) is given below.

| | |
|----------------|------------------------------------|
| RBC | $5.2 \times 10^{12}/L$ |
| Hb | 8.5 g/dL |
| MCV | 68 fL |
| MCH | 20 pg |
| MCHC | 26 g/dL |
| RDW | 16% |
| WBC | $5.2 \times 10^3/\mu L$ |
| | N – 50%, L – 45%, M – 03%, E – 02% |
| Platelet count | $450 \times 10^9/\mu L$ |

3.1.1. Comment on the FBC report and state the morphological type of anaemia. (04 marks)

3.1.2. What is your differential diagnosis? (06 marks)

3.1.3. Suggest further investigations with the expected findings in each condition you have mentioned in 3.1.2. (30 marks)

3.2. Briefly describe the pathogenesis of disseminated intravascular coagulation (DIC). (30 marks)

3.3. Write short notes on

3.3.1. Cryoprecipitate. (15 marks)

3.3.2. Antiglobulin test (Coombs test). (15 marks)

Contd..../4-

PART C**CHEMICAL PATHOLOGY**

4.

4.1. Discuss the role of cardiac troponins in the clinical diagnosis and management of diseases. (60 marks)

4.2.

4.2.1. A 20 year old girl presented with neck pain of one week's duration following a viral infection.

Her biochemical investigations are as follows:

| | | | |
|---------------|-----|--------|-------------|
| Free T4 | 42 | pmol/L | (10 -25) |
| TSH | 3.0 | mIU/L | (0.4 - 4.2) |
| Thyroglobulin | 80 | ng/mL | (3 - 40) |

Explain her biochemical findings. (20 marks)

4.2.2. Following results are from a 83 year old bed-ridden patient.

| | | | |
|----------------------|------|--------|------------|
| Gamma-GT | 35 | IU/L | (5 - 38) |
| AST | 23 | IU/L | (< 40) |
| ALT | 32 | IU/L | (<40) |
| Alkaline phosphatase | 1324 | IU/L | (45 - 115) |
| Total protein | 64 | g/L | (60 - 80) |
| Albumin | 35 | g/L | (35 - 45) |
| Globulin | 29 | g/L | |
| Total bilirubin | 12 | µmol/L | (5 - 20) |
| Direct bilirubin | 7 | µmol/L | (<7) |

Comment on the above results. (20 marks)

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Date: 29th September 2016

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ESSAY PAPER

Answer all questions.

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PART A

ANATOMICAL PATHOLOGY (GENERAL & SYSTEMIC)

1. Describe the pathogenetic mechanisms responsible for the following lesions.

1.1 'Nutmeg liver' in a sixty year old male with congestive cardiac failure. (30 marks)

1.2 Long-standing multinodular goitre in a forty-five year old female. (30 marks)

1.3 Cerebral infarction in a seventy-five year old male who had a transmural myocardial infarction, five days prior. (40 marks)

2.

2.1 Describe the differences between 'stable' and 'unstable' atheromatous plaques, in relation to their structure and clinical effects. (40 marks)

2.2 List five prognostic factors for breast carcinoma that are included in a Pathology report, indicating how each factor influences the prognosis. (40 marks)

2.3 List the different classes of growth-regulatory genes that are the targets for oncogenic agents, giving an example for each class. (20 marks)

PART B

HAEMATOLOGY

3.

3.1 A 20 year old girl was admitted to medical ward with shortness of breath on exertion, pallor and icterus for three (03) days duration.

Her full blood count (FBC) is given below

Haemoglobin 7 g/dL, MCV 90 fL, MCH 28pg, WBC/DC & platelet counts are normal

3.1.1 State the most likely condition for the above presentation (10 marks)

3.1.2 State four (04) important and relevant questions that you should ask in the history of this patient to establish the diagnosis (10 marks)

3.1.3 List four (04) initial investigations with the expected findings necessary to confirm the condition you mentioned in 3.1.1 (20 marks)

3.2 State five (05) advices you would give to a patient who has been recently started on warfarin treatment (20 marks)

3.3 List four (04) probable causes and four (04) investigations for each of the following clinical conditions stated below (40 marks)

3.3.1 Febrile reaction five (05) minutes after starting blood transfusion

3.3.2 A 50 year old man with haemoglobin of 20 g/dL and PCV 56%

3.3.3 A 60 year old man with prolonged PT, APTT, and TT

3.3.4 A Pregnant lady with low platelet count

PART C

CHEMICAL PATHOLOGY

4.

4.1 Discuss the causes and pathogenesis of hypocalcaemia in an adult patient and outline the biochemical investigations to arrive at a diagnosis/ diagnoses.

(60 marks)

4.2 A 30 year-old lady with 7 weeks of amenorrhoea (POA) presented with the complaint of excessive vomiting to the outpatient department (OPD) in a Base Hospital.

Her laboratory investigations revealed the following:

Random plasma glucose 2.5 mmol/L

Serum

Sodium 135 mmol/L (135 - 145)

Potassium 3.1 mmol/L (3.5 - 5.3)

Creatinine 110 μ mol/L (60 - 120)

Urea 12 mmol/L (2.9 - 9.2)

Urine for hCG - positive

Urine for ketone bodies - positive

4.2.1 Mention the differential diagnoses for excessive vomiting in this patient.

4.2.2 Mention one biochemical investigation that will help to differentiate the diagnoses mentioned in question No. 4.2.1 from normal pregnancy.

4.2.3 Explain the pathogenesis of hypokalemia in this patient.

4.2.4 Interpret her renal function tests.

4.2.5 What is the most probable cause for the presence of ketone bodies in her urine?

(20 marks)

4.3 A 36 year-old woman, presented with a febrile illness, which was later diagnosed as pneumonia. She was started on Intravenous (IV) antibiotics.

Her investigations revealed the following:

Serum

Iron 2.0 μ mol/L (9 - 27)

TIBC 30.0 μ mol/L (45 - 70)

% Iron saturation 6.0 (10 - 35)

Ferritin 801.0 μ g/L (10 - 160)

Whole blood

| | | | |
|-------------|------|------|---------------|
| Haemoglobin | 10.0 | g/dL | (11.5 – 16.5) |
|-------------|------|------|---------------|

4.3.1 Discuss the laboratory findings.

4.3.2 What is/are the cause/s for the above laboratory findings?

(15 marks)

4.4 A biochemistry laboratory in a Base hospital received a blood sample from a 7 year-old male child without any clinical history.

His laboratory investigation results revealed the following:

| | | | |
|-------------------|-----|-------|-------------|
| Serum Cholesterol | 412 | mg/dL | (125 - 189) |
|-------------------|-----|-------|-------------|

| | | | |
|---------------|----|-----|-----------|
| Serum Albumin | 18 | g/L | (34 - 54) |
|---------------|----|-----|-----------|

4.4.1 What is the most probable diagnosis?

4.4.2 Name one biochemical investigation that will help to arrive at the diagnosis you mentioned in Question No (4.4.1)

(5 marks)