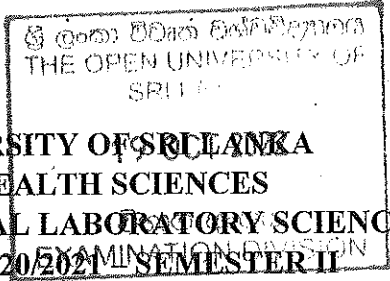


053



THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF MEDICAL LABORATORY SCIENCES
ACADEMIC YEAR 2020/2021 SEMESTER II



BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS
MDU5305 – WORK BASED TRAINING III
FINAL EXAMINATION – PRACTICAL BASED STRUCTURED ESSAY

DURATION: 03 HOURS

DATE: 19th OCTOBER 2022

TIME: 09.30 AM – 12.30 PM

INDEX NO:

- IMPORTANT INSTRUCTIONS/INFORMATION TO CANDIDATES**
- This question paper consists of 9 pages with 6 practical based structured essay questions.
 - Write your Index Number in the space provided.
 - Answer ALL questions.
 - Write answers within the space provided.
 - Do not remove any page/part of this question paper from the examination hall.
 - Mobile phones and any other electronic equipment are NOT allowed. Leave them outside.

Question 01

(Total: 10 marks)

A 50-year-old female presents with complaints of excessive thirst, fluid intake, and urination. She denies any urinary tract infection symptoms. She reports no medical problems but has not seen a doctor in many years. On examination, she is an obese female in no acute distress. Her physical exam is otherwise normal. The urinalysis gave the following results.

Urine full report

Dipstick analysis:

Colour	Yellow
Turbidity	Turbid
Specific gravity	1.030
Ph	7
Protein	+++
Glucose	++
Urobilinogen	Normal
Bilirubin	Normal
Blood	Negative
Ketones	Negative
Leucocytes	Nil

Urine deposit:

Epithelial cells	1 – 2
Pus cells	3 – 4
Red blood cells	Nil
Crystals	Nil
Casts	Granular cast +
Organisms	+

1.1 Give the most likely diagnosis with reasons. (01 marks)

.....

.....

1.2 If you are working in a rural laboratory and do not have access to urine dipsticks or any other form of reagents, list the steps you would follow for testing urine protein. (03 marks)

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1.3 Mention the minimum Random Blood Sugar (RBS) value you would expect for this patient giving reasons. (02 marks)

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1.4 What is the pathophysiology behind the presence of granular casts? (02 marks)

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1.5 The clinician then requested for an eGFR report which gave a value of 50 ml/min/1.73 m².

(a) What is the stage of renal failure based on the above finding? (01 mark)

.....

(b) Several equations are used to calculate the eGFR value. According to your understanding name two (02) parameters required to calculate the eGFR. (01 mark)

1.

2.

Question 02

(Total: 10 marks)

A 3-year-old boy is brought to the emergency department after several episodes of vomiting and lethargy. His paediatrician has been concerned about his failure to thrive and possible hepatic failure along with recurrent episodes of vomiting, diarrhoea, and lethargy. The laboratory findings are given below. After a careful history is taken, you observe that these episodes occur after ingestion of certain food types rich in fructose, sweets, and fruits. His blood sugar was checked in the emergency department and was extremely low. The stool full report was as follows.

Macroscopic appearance

Colour	Yellow
Consistency	loose
Reaction	alkaline
Blood	absent
Mucus	absent

Microscopic appearance

Ova	absent
Amoeba	absent
Cyst	absent
Red blood cells	absent
Pus cells	absent
Fat globules	absent
Bacterial flora	present
Epithelial cells	present
Crystals	absent

2.1 List two (02) causes of diarrhoea that can be excluded based on the findings of the stool full report. (02 marks)

- 1.
- 2.

2.2 What is the most likely diagnosis? Give the reasons for your answer (02 marks)

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2.3 What is the biochemical basis for the hypoglycaemia? (02 marks)

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2.4 Name one biochemical test that can be used to demonstrate presence of fructose in urine and stool samples. (01 mark)

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2.5 The condition you mentioned in 2.2 is not the only condition that can cause similar symptoms.

(a) Name another condition of the digestive tract that can lead to similar signs and symptoms. (01 mark)

.....

(b) State how you can use the test mentioned in 2.4 to differentiate the conditions that you mentioned in 2.2 and 2.5.a. (02 marks)

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Question 03 (Total: 10 marks)

A 62-year-old male who has had a worsening cough for several months now has dyspnoea. A chest radiograph shows a right lung mass. Fine Needle Aspiration (FNA) was obtained from the mass and fluid specimen was sent to the laboratory for analysis.

3.1 When inspecting this fluid sample, a clot (0.5*0.5cm) was observed. Briefly state how you would process this specimen. (02 mark)

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.....

3.2 The H & E stained slides prepared from the above specimen showed uneven staining. Write two (02) possible causes for this. (02 marks)

1.
2.

3.3 Give three (03) steps you would follow to ensure quality assurance when performing the H & E stain. (03 marks)

1.
2.
3.

3.4 After the slides were stained, brown artifacts were observed. How would you correct the mentioned artifact. (01 mark)

.....
.....

3.5 The laboratory received a cytology specimen from a patient known to have small cell lung carcinoma. What precautionary steps would you take when staining this sample with the other specimens. (02 marks)

Question 04

(Total: 10 marks)

A 29-year-old female patient involved in a road traffic accident was admitted to the Emergency department (ED). A blood testing on admission gave the following results

Red blood cell count	0.99 x 10 ¹² /L
Haematocrit	8 %
Haemoglobin concentration	10 g/dL
Mean Corpuscular Volume	110 fl
Mean corpuscular haemoglobin	101 pg
Mean corpuscular haemoglobin concentration	980 g/L

In the second sample, after repeated collection, almost equal results were observed. Blood smear examination under the microscope revealed clusters of erythrocytes.

4.1 Interpret the above results giving a probable diagnosis. (02 mark)

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4.2 How would you proceed to process this specimen? (01 mark)

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4.3 Another specimen is requested to confirm the diagnosis using serological testing. Explain the specimen collection process. (03 marks)

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4.4 Name the first serological test you would perform on the specimen. (01 mark)

4.5 Due to heavy blood loss the patient requires a blood transfusion. Explain how you would carry out the forward and reverse grouping for this patient. (03 marks)

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Question 05 (Total: 10 marks)

An icteric neonate was transferred from a peripheral hospital 20 hours after birth. The laboratory received a sample for blood grouping, direct antiglobulin testing and cross-matching for transfusion purposes. On performing the forward grouping, it was found to be A positive. The mother was said to be O positive but a sample was not obtained from her since she was not transferred from the peripheral hospital.

5.1 What is the most probable cause for the neonate being icteric? (01 mark)

5.2 Reverse grouping for the sample was not done as per the departmental standard operating procedure (SOP) designed for blood grouping on samples from neonates.

(a) What is the basis behind not performing the reverse grouping on neonates? (02 mark)

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(b) What is the specimen that you would use to perform the major cross match for a neonate before the transfusion? (01 mark)

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5.3 A cross match was performed between an O positive packed red blood cell unit and the neonate's sample. Why was the cross match performed with a O positive red blood cell unit instead of an A positive red blood cell unit? (02 marks)

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5.4 The results of the cross match showed that it was incompatible. Same results were shown when the test was repeated. At this point a blood sample from the mother was brought and a blood grouping was performed. The following results were obtained. What is the blood group of the mother? (02 marks)

Anti A	Anti AB	Anti B	A cells	B cells	O cells
0	0	0	+4	+4	+4

.....

5.5 Given the results of the blood grouping in 5.4, what is the antibody responsible for haemolysis in the neonate? (02 marks)

.....

Question 06 (Total: 10 marks)

A 30-year-old phlebotomist reports that a needle nicked her finger when drawing blood from a patient. The phlebotomist has been vaccinated for Hepatitis B. Blood samples were collected from the phlebotomist and the patient she was drawing blood from.

6.1 Write down two (02) tests you would conduct on the patient sample. (01 mark)

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6.2

(a) Write down the testing method/ technique for the tests mentioned in 6.1 above. (01 mark)

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(b) Write one (01) advantage and one disadvantage of this method. (02 marks)

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.....
6.3 If the tests mentioned in 6.1 are positive, what are the tests used for the confirmation of each? (02 marks)

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6.4 The phlebotomists' sample is sent to the Medical Research Institute (MRI) for testing.

(a) What is the test carried out on this specimen? (01 mark)

.....

(b) Why is this test carried out? (01 mark)

.....

6.5 Both tests carried out on the patient sample are negative. However, the test carried out on the phlebotomists' sample gave test values below the expected level.

(a) What is the next step with respect to the Standard Operating Procedure (SOP) in handling needle prick injuries. (01 mark)

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(b) Why is the step mentioned in 6.4 (a) carried out even when the tests on the patient sample are negative. (01 mark)

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