



PAST PAPERS

Faculty	Department / Section/Division
Not Applicable	Learning Resource Centre

Past Papers

Faculty of Health Sciences

**Higher Diploma in Biomedical sciences**

**(Year 2 – Semester I)**

Document Control & Approving Authority	Senior Director – Quality Management & Administration
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1 <sup>st</sup> Issue Date: 2017.01.30	Revision No.00	Revision Date: 27.2.2024	Validated by: Librarian
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**Faculty of Health Sciences**  
**Higher Diploma in Biomedical Sciences**  
**HD 2143- Introduction to Immunobiology**  
**Batch – 02**  
**2<sup>nd</sup> Year 1<sup>st</sup> Semester**  
**End Semester SEQ Examination**

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**Date** : 2024.04.03  
**Time** : 9.00 am. – 11.00 pm. (Two Hours)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

- Question 01** **(100 marks)**
- 1.1 Define the innate and adaptive immune system. (10 marks)
- 1.2 State the components of innate immune system. (15 marks)
- 1.3 Briefly describe the phagocytosis. (15 marks)
- 1.4 Describe the mechanism of natural killer cells activation via antibodies. (60 marks)
- Question 02** **(100 marks)**
- 2.1 Define the complement system. (10 marks)
- 2.2 Differentiate the classical and alternative pathways. (15 marks)
- 2.3 Briefly describe the activity of membrane attack complex molecule. (25 marks)
- 2.4 Describe the alternative pathway of complement activation. (50 marks)
- Question 03** **(100 marks)**
- 3.1 Define the active and passive immunity of adaptive immunity. (20 marks)
- 3.2 Describe the below terms.
- 3.3.1 Naturally Acquired Active Immunity. (25 marks)
- 3.3.2 Naturally Acquired Passive Immunity. (25 marks)
- 3.3 Describe the ELISA method. (30 marks)
- Question 04** **(100 marks)**
- 4.1 Define the below terms.
- 4.1.1 Antigen. (10 marks)
- 4.1.2 Antibody. (10 marks)

- 4.1.3 Antigenicity. (10 marks)
- 4.1.4 Immunogenicity. (10 marks)
- 4.2 State the types of Major Histocompatibility complexes. (30 marks)
- 4.3 Describe the endocytic pathway of antigen presentation. (30 marks)



**Faculty of Health Sciences**  
**Higher Diploma in Biomedical Sciences**  
**HD 2133 Clinical Biochemistry**  
 Batch – 02  
 2<sup>nd</sup> Year 1<sup>st</sup> Semester  
 End Semester SEQ Examination

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**Date** : 2024.04.01  
**Time** : 9.00 am. – 11.00 pm. (Two Hours)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

**Question 1** **(100 marks)**

- 1.1 List three (03) importance of serum electrolytic test. (15 marks)
- 1.2 List three (03) body mechanisms important in regulating acid-base balance in human body. (15 marks)
- 1.3 A 55-year-old man, complained of intractable vomiting suspected of suffering from pyloric stenosis receiving treatment showed following acid base data on second day of the treatment.

Laboratory data	Reference
pH 7.75	(7.35-7.45)
pCO <sub>2</sub> 41 mmHg	(35 - 45 mmHg)
HCO <sub>3</sub> <sup>-</sup> 39 mmol/L	(22 – 26 mmol/L)

- 1.3.1 Interpret the lab report and identify the acid-base disorder. (35 marks)
- 1.3.2 How does vomiting induced this acid-base disorder? (35 marks)

**Question 2** **(100 marks)**

- 2.1 What are the clinical application of liver profile test? (20 marks)
- 2.2 List three commonly measured biomarkers for liver health. (20 marks)
- 2.3 Describe indications for lipid profile. (30 marks)
- 2.4 Explain how would you advice to a patient before lipid profile test. (30 marks)



**Question 03****(100 Marks)**

A 50-year-old male presented at the hospital to carry out her annual blood serum urea, serum creatinine and blood cholesterol levels.

- 3.1 Discuss the clinical laboratory path flow of a laboratory from patient sample submission step to test results dispatch. (30 marks)
- 3.2 Define the terms of sensitivity, specificity and false positive results. (20 marks)
- 3.3 Describe the suitable method of blood collection method for the above-mentioned patient along with the appropriate blood collection tubes. (20 marks)
- 3.4 Based on the laboratory test results blood serum urea, creatinine level and blood cholesterol levels indicated as above the reference range. Describe the expected results of a patient. (30 marks)

**Question 04****(100 marks)**

- 4.1 Define the term of erythropoiesis. (15 marks)
- 4.2 Differentiate the hemoglobin and myoglobin structures. (25 marks)
- 4.3 Briefly describe the cyanmethemoglobin method and Oxyhemoglobin method. (30 marks)
- 4.4 Write the short notes of following terms.
  - 4.4.1 Alpha-thalassemia (15 marks)
  - 4.4.2 Sickle cell anemia. (15 marks)



Faculty of Health Sciences  
Higher Diploma in Biomedical Sciences  
HD 2113- Haematology and Transfusion Science  
Batch – 02  
2<sup>nd</sup> Year 1<sup>st</sup> Semester  
End Semester SEQ Examination

Date : 2024.03.25  
Time : 9.00 am. – 12.00 pm. (Three Hours)

**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

**Question 01**

**(100 marks)**

- 1.1 Define the term of haemopoiesis. (10 marks)  
1.2 State the sites of haemopoiesis. (15 marks)  
1.3 Differentiate the pluripotent and unipotent cells. (15 marks)  
1.4 Describe the mechanism of haemopoiesis take place within the bone marrow. (60 marks)

**Question 02**

**(100 marks)**

- 2.1 Define the term of peripheral blood cells. (15 marks)  
2.2 State the component of whole blood. (20 marks)  
2.3 Describe the structure of haemoglobin molecule. (20 marks)  
2.4 Write the short notes of below terms.  
2.4.1 Plasmin (15 marks)  
2.4.2 Anti-thrombin (15 marks)  
2.4.3 Protein S and C. (15 marks)

**Question 03**

**(100 marks)**

- 3.1 Define the term of anaemia. (15 marks)  
3.2 Briefly describe the classification of anaemia. (25 marks)  
3.3 Describe the laboratory identification method of iron deficiency anaemia. (30 marks)  
3.4 Write the short notes of below terms.  
3.4.1 Sideroblastic anemia (15 marks)  
3.4.2 Thalassemia. (15 marks)

**Question 04****(100 marks)**

- 4.1 Define the term of haemostasis. (15 marks)
- 4.2 State the functions of haemostatic mechanism. (25 marks)
- 4.3 State the information which can be obtained from automated hematology counter report. (30 marks)
- 4.4 Describe the mechanism of haemostasis. (30 marks)

**Question 05****(100 marks)**

- 5.1 Define the term of extrinsic pathway of coagulation. (10 marks)
- 5.2 Briefly describe the intrinsic and extrinsic pathway of coagulation. (30 marks)
- 5.3 Briefly describe the blood ABO group compatibility patterns. (30 marks)
- 5.4 Describe the below terms of blood transfusion.
- 5.4.1 Platelet concentrate. (15 marks)
- 5.4.2 Fresh frozen plasma. (15 marks)

**Question 06****(100 marks)**

- 6.1 State the purpose of donor selection. (25 marks)
- 6.2 State the steps involved in donor selection process. (25 marks)
- 6.3 Briefly describe the steps of donor blood collection. (25 marks)
- 6.4 Describe the laboratory investigation of acute lymphoblastic leukemia and chronic lymphocytic leukemia. (25 marks)





**Faculty of Health Sciences**  
**Higher Diploma in Biomedical Science**  
**HD 2143- Introduction to Immunobiology**  
**2<sup>nd</sup> year 1<sup>st</sup> semester**  
**Batch 01**  
**Repeat End Semester SEQ Examination**

INDEX NUMBER: .....

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Date : 07.03.2023  
Time : 09.00 am – 11.00 am (2 hours)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- You should write answers legibly in black or blue ink
- You are not allowed to take out the examination papers.

- Question 01** **(100 marks)**
- 1.1 Briefly Describe innate immune system. (10 marks)
- 1.2 State immune cells involved in innate and adaptive immune system. (15 marks)
- 1.3 Draw and label the common structure of an antibody. (15 marks)
- 1.4 Briefly describe the phagocytosis process of the phagocytic cells. (60 marks)



**Question 02** (100 marks)

- 2.1 Define the Complement system. (10 marks)
- 2.2 State and describe the types of complement activations under complement system. (20 marks)
- 2.3 Briefly describe the membrane attack complex (MAC) formation. (30 marks)
- 2.4 Describe the classical complement pathway activation. (40 marks)

**Question 03** (100 marks)

- 3.1 State four routes of vaccine administration with examples. (20 marks)
- 3.2 Write the short notes. (80 marks)
  - 3.2.1 Live vaccines
  - 3.2.2 Inactivated vaccines.
  - 3.2.3 Primary vaccination
  - 3.2.4 Booster vaccination

**Question 04** (100 marks)

- 4.1 Define the term of "Allergen". (10 marks)
- 4.2 Define the hypersensitivity reaction. (20 marks)
- 4.3 Classify the hypersensitivity reaction. (30 marks)
- 4.4 Describe the type I hypersensitivity reaction. (40 marks)



**Faculty of Health Sciences**  
**Higher Diploma in Biomedical Sciences**  
**Quality Assurance & Quality Control HD2153**  
**Batch – 01**  
**2<sup>nd</sup> Year 1<sup>st</sup> Semester**  
**End semester SEQ Examination**

**INDEX NUMBER:** .....

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**Date** : 15.09.2022  
**Time** : 9.00 am. – 12.00 pm. (Two Hours)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.



**Question 01****(100 marks)**

- 1.1 Define the term "Accuracy" & "Precision". (20 marks)
- 1.2 What are the three types of measurement errors? (20 marks)
- 1.3 A student has done an acid base titration and the reading was  $26.00 \text{ cm}^3$ . He found that the actual reading was  $25.00 \text{ cm}^3$ .
- 1.3.1 Calculate the absolute error of this experiment. (30 marks)
- 1.3.2 Calculate the relative error of this experiment. (30 marks)

**Question 02****(100 marks)**

2.1. Following results were obtained from a blood sample of a patient for blood glucose measurements in mg/dl

40, 48, 39, 38, 45

- 2.1.1 Find the mean for the above data series. (40 marks)
- 2.1.2 Find the standard deviation for the above data series. (45 marks)
- 2.2 State **three** characteristics of "Normal Distribution Curve". (15 marks)

**Question 03****(100 marks)**

3.1 A Clinical laboratory obtained a serum potassium level of  $5.0 \text{ mmol/l}$  by using Beckman coulter analyser. The IQC range for serum potassium is  $2.7 - 4.5 \text{ mmol/l}$ .

- 3.1.1 Comment on this statement. (35 marks)
- 3.2.2 Write the two levels of quality control in a laboratory. (20 marks)
- 3.2. State the two types of "Audits". (10 marks)

- 3.3 Upper specification limit (USL) is 33.20 g and the lower specification limit (LSL) is 32.71 g. The standard deviation ( $\sigma$ ) is 0.042 g and the average value is 32.88 g. Find the "Process Capability" ( $C_p$ ) for the given data. (35 marks)

$$C_p = \frac{USL - LSL}{6\sigma}$$

**Question 04** (100 marks)

- 4.1 What are the two types of QMS and their purposes? (30 marks)
- 4.2 Define ISO 9000 International Standard (10 marks)
- 4.3 Discuss the principles of the ISO 9000 standard. (30 marks)
- 4.4 Discuss how the ISO 9000 International standard is applied. (30 marks)

**Question 05** (100 marks)

- 5.1 State the purpose of a Standard Operating Procedure (SOP) (20 marks)
- 5.2 What is the "Four P's Model" when developing an SOP? (20 marks)
- 5.3 Discuss three types of SOPs. (30 marks)
- 5.4 State the characters of following elements of a SOP
- 5.4.1 Writing style of a SOP. (10 marks)
  - 5.4.2 General format of a SOP. (10 marks)
  - 5.4.3 Title page. (10 marks)



**Question 06****(100 marks)**

- 6.1 Mention how record keeping and data management is done within a laboratory (20 marks)
- 6.2 What are the standards for Laboratory Quality Assurance? (10 marks)
- 6.3 State the analytical phases of Laboratory Quality Assurance. (30 marks)
- 6.4 Briefly describe common analytical errors within a laboratory (25 marks)
- 6.5 What is Record retention? (15 marks)



**Faculty of Health Sciences**  
**Higher Diploma in Biomedical Sciences**  
**Clinical Biochemistry HD 2133**  
**2<sup>nd</sup> year 1<sup>st</sup> semester –Batch 01**  
**End Semester Examination- SEQ Examination**

**INDEX NUMBER:**

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**Date** : 09.09.2022  
**Time** : 09.00 am – 11.00 pm (2 hours)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of SIX questions.
- Answer ALL questions.
- You should write legibly in black or blue ink
- You are not allowed to take out the examination papers.



**Question 01****(100 marks)**

- 1.1 State difference between the plasma and serum. (25 marks)
- 1.2 Discuss three different laboratory test results which obtained from clinical samples. (30 marks)
- 1.3 Mention three experimental errors which can occur in a laboratory test. (15 marks)
- 1.4 Discuss the intra and extra laboratory factors which interfering with laboratory test results. (30 marks)

**Question 02****(100 marks)**

An 18-year-old girl, complained of intractable vomiting suspected of suffering from pyloric stenosis receiving treatment showed following acid base data on second day of the treatment.

**Laboratory data**

		<u>Reference</u>
pH	7.65	(7.35-7.45)
pCO <sub>2</sub>	42 mmHg	(35 - 45 mmHg)
HCO <sub>3</sub> <sup>-</sup>	37 mmol/L	(22 - 26 mmol/L)

- 2.1 Interpret the lab report and identify the acid-base disorder. (35 marks)
- 2.2 How does vomiting induced this acid-base disorder? (30 marks)
- 2.3 Justify the role of respiratory center and kidneys in this situation (35 marks)

**Question 03****(100 marks)**

- 3.1 List three commonly measured biomarkers for liver health. (25 marks)
- 3.2 Write indications for lipid profile. (30 marks)
- 3.3 Describe patient advices before lipid profile test. (30 marks)
- 3.4 What are the major sources of liver cholesterol? (15 marks)

**Question 04****(100 marks)**

4.1 Define following terms.

4.1.1. False negative test

(20 marks)

4.1.2. Accuracy of a test

(20 marks)

4.1.3. Sensitivity of a test

(20 marks)

4.1.4 Reference range

(20 marks)

4.2 Why are reference ranges are important in a biomedical laboratory?

(20 marks)

**Question 05****(100 marks)**

5.1 State the structure of the haemoglobin and its function.

(20 marks)

5.2 What are the normal ranges for haemoglobin level for men and for women?

(20 marks)

5.3 List most common 3 types of haemoglobin and describe their structure.

(15 marks)

5.4 What types of haemoglobin are present in sickle cell disease?

(20 marks)

5.5 What is the technique used to check the different types of haemoglobin in the blood?

(25 marks)

**Question 06****(100 marks)**

A 45-year-old female presented at the medical center to carry out her annual blood cholesterol test.

6.1 Discuss the clinical laboratory path flow of a laboratory from patient sample submission step to test results dispatch.

(30 marks)

6.2 Differentiate sensitivity and specificity.

(20 marks)

6.3 State different types of blood collection techniques.

(20 marks)

6.4 Clinician concluded that patient was suffering from Hypercholesterolemia after analyzing the laboratory test results. Mention expected results of a patient suffering from hypercholesterolemia.

(15 marks)

6.5 State the principle of test when determination of total cholesterol based on enzymatic method using Cholesterol Esterase, Cholesterol Oxidase and Peroxidase.

(15 marks)

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**Faculty of Health Sciences**  
**Higher Diploma in Biomedical Sciences**  
**Haematology and Transfusion Science HD 2113**  
**2<sup>nd</sup> year 1<sup>st</sup> semester –Batch 01**  
**End Semester Examination- SEQ Examination**

**INDEX NUMBER:**

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**Date** : 05.09.2022  
**Time** : 09.00 am – 12.00 pm (3 hours)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of SIX questions.
- Answer ALL questions.
- You should write legibly in black or blue ink
- You are not allowed to take out the examination papers.



**Question 01****(100 marks)**

- 1.1 Define the term hemopoiesis. (05 marks)
- 1.2 Mention different types of stem cells depending on hierarchy of cell potency. (10 marks)
- 1.3 Describe the process of hemopoiesis with the growth factors involved in the process. (35 marks)
- 1.4 What are the general characteristics of myeloid and lymphoid growth factors? (15 marks)
- 1.5 Illustrate the regulation of hemopoiesis. (25 marks)
- 1.6 Mention the function of lymphocytes. (10 marks)

**Question 02****(100 marks)**

Write short notes on following blood components by mentioning structure and function.

- 2.1 Red blood cells (25 marks)
- 2.2 Neutrophils (25 marks)
- 2.3 Eosinophils (25 marks)
- 2.4 Basophils (25 marks)

**Question 03****(100 marks)**

- 3.1 What are the Routine Haematological tests? (15 marks)
- 3.2 State the information which can be obtained from automated Haematology counter reports (10 marks)
- 3.3 Discuss the two principles used in fully automated haematology analysers (40 marks)
- 3.4 Define Haemostasis (5 marks)
- 3.5 Discuss the mechanism of haemostasis (30 marks)

**Question 04****(100 marks)**

- 4.1 Define Iron Deficiency Anaemia (IDA). (10 marks)
- 4.2 What are the causes of IDA? (15 marks)
- 4.3 Discuss the red blood cell morphology and iron parameters of patient with IDA. (30 marks)
- 4.4 What are the clinical features of a patient suffering from IDA? (20 marks)
- 4.5 Outline the laboratory tests used to investigate IDA. (25 marks)

**Question 05****(100 marks)**

- 5.1 Mention the purpose blood transfusion (20 marks)
- 5.2 What are the different blood group types? (15 marks)
- 5.3 Define Rational Use of Blood. (10 marks)
- 5.4 State the use of centrifuge in preparation of blood components (15 marks)
- 5.5 Discuss the indications of following blood components.
- 5.5.1 Whole blood (10 marks)
- 5.5.2 Red cell concentrate (10 marks)
- 5.5.3 Leucocyte depleted red cells (10 marks)
- 5.5.4 Single donor platelet concentrate (10 marks)

**Question 06****(100 marks)**

- 6.1 Discuss the structure and function of platelets. (25 marks)
- 6.2 Describe the activation and regulation of Fibrinolysis. (30 marks)
- 6.3 What are the disorders of fibrinolysis? (20 marks)
- 6.4 Outline the naturally occurring anticoagulants and their importance. (25 marks)