

Higher Diploma in Biomedical Sciences

2nd Year 1st Semester
Examination Papers



Faculty of Health Sciences
Higher Diploma in Biomedical Sciences
Haematology and Transfusion Science HD 2113
2nd year 1st 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)

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. (10 marks)
- 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)



Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Sciences
BMS 2123 – Molecular Biology
2nd year 1st semester
Higher Diploma
End Semester SEQ Examination

INDEX NUMBER:

Date : 07th of August 2022
Time : 9.00 a.m. to 12.00 p.m.

INSTRUCTIONS TO CANDIDATES

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

QUESTION 01**(100 marks)**

- 1.1. What is DNA? (15 marks)
- 1.2. Define the following terms. (20 marks)
- 1.2.1 Chromosome
- 1.2.2 Genome
- 1.2.3 Gene
- 1.2.4 Karyotype
- 1.3 Draw the structure of chromosome and labelled the parts. (30 marks)
- 1.4 Mention 04 differences between RNA and DNA. (20 marks)
- 1.5 List 02 functions of tRNA. (15 marks)

QUESTION 02**(100 marks)**

- 2.1. What are the significance of DNA replication? (15 marks)
- 2.2 List 05 bacterial DNA replication proteins and their functions. (25 marks)
- 2.3 Briefly describe the 03 stages of RNA transcription. (30 marks)
- 2.4 Compare the translation in Bacteria and Eukaryotes. (30 marks)

QUESTION 03**(100 marks)**

- 3.1. Mention 02 types of spontaneous DNA damage and briefly describe them. (30 marks)
- 3.2 Define the term "Gel Electrophoresis". (15 marks)
- 3.3 Briefly describe the principal of "Gel Electrophoresis". (20 marks)
- 3.4 What is needed for "Gel Electrophoresis"? (15 marks)
- 3.5 Briefly describe process of "Gel Electrophoresis". (20 marks)

QUESTION 04**(100 marks)**

- 4.1. What is Blotting Technique? (15 marks)
- 4.2 Write 05 applications on Southern Blotting. (25 marks)
- 4.3 What are the steps in gene cloning? (15 marks)
- 4.4 What are the uses of PCR in recombinant DNA? (25 marks)
- 4.5 List down the uses of restriction fragments? (20 marks)



Faculty of Health Sciences
Higher Diploma in Biomedical Sciences
Clinical Biochemistry HD 2133
2nd year 1st 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)

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 ₂	42 mmHg	(35 - 45 mmHg)
HCO ₃ ⁻	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)



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

INDEX NUMBER:

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

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
2nd Year 1st Semester
End semester SEQ Examination

INDEX NUMBER:

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

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 cm^3 . He found that the actual reading was 25.00 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 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 (σ) 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)