



PAST PAPERS

<i>Faculty</i>	<i>Department / Section/Division</i>
<i>Not Applicable</i>	<i>Learning Resource Centre</i>

Past Papers

Faculty of health science

Bachelor of Science honours in Biomedical Sciences

Year 4 – Semester II

<i>Document Control & Approving Authority</i>	<i>Senior Director – Quality Management & Administration</i>
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Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Sciences
BMS 4213 Immunobiology
 Batch – 02 & 03
 4th Year 2nd Semester
 End Semester SEQ Examination



Date : 05th of January 2024
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 innate immunity of the immune system. | (15 marks) |
| 1.2 Classify the components of innate immunity. | (25 marks) |
| 1.3 Describe first line defense mechanism of innate immunity. | (25 marks) |
| 1.4 Describe the process of phagocytosis via an illustration. | (35 marks) |

Question 02

- | | |
|---|--------------------|
| | (100 marks) |
| 2.1 Define the active and passive immunity of adaptive immunity. | (20 marks) |
| 2.2 Classify the adaptive immunity based on the mode of development. | (20 marks) |
| 2.3 Classify the adaptive immunity based on the effector molecules. | (25 marks) |
| 2.4 Explain the mechanism of activation of B cells under the adaptive immunity. | (35 marks) |

Question 03

- | | |
|--|--------------------|
| | (100 marks) |
| 3.1 Define the active and passive immunotherapies. | (30 marks) |
| 3.2 Briefly describe the types of immunotherapies. | (35 marks) |
| 3.3 Write the short notes of following terms. | |
| 3.3.1 Non-specific cancer immunotherapies | (15 marks) |
| 3.3.2 Monoclonal antibodies | (10 marks) |
| 3.3.3 Cancer vaccine | (10 marks) |

- Question 04** (100 marks)
- 4.1 Define the terms of antigenicity and immunogenicity. (20 marks)
- 4.2 Explain the endocytic pathway of antigen presentation. (25 marks)
- 4.3 Differentiate the MHC classes which involved in antigen presentation. (25 marks)
- 4.4 Write the short notes of following terms.
- 4.4.1 Exogenous antigen (15 marks)
- 4.4.2 Endogenous antigen (15 marks)
- Question 05** (100 marks)
- 5.1 Describe the primary vaccination and the booster vaccination. (20 marks)
- 5.2 State the routes of vaccine administration with examples. (25 marks)
- 5.3 State the five types of vaccinations. (25 marks)
- 5.4 Write the short notes.
- 5.4.1 Live vaccines (15 marks)
- 5.4.2 Inactivated vaccines. (15 marks)
- Question 06** (100 marks)
- 6.1 Define the terms autoimmunity and peripheral tolerance. (25 marks)
- 6.2 Briefly describe autoimmune mechanism of "Myasthenia gravis" disease. (25 marks)
- 6.3 Briefly describe the transplantation rejection take place via indirect presentation by T cells. (25 marks)
- 6.4. State the steps of a method that can be quantify the antibodies produced during primary respond in a host. (25 marks)



Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Sciences
BMS 4233 Applied Biochemistry
 Batch – 02/03
 4th Year 2nd Semester
 End semester SEQ Examination



Date : 08th of January 2024
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.
- You are allowed to use a scientific calculator for the examination.

QUESTION 01

(100 marks)

- 1.1 Show an electrophoresis pattern for serum of healthy adult individual by a labeled diagram. (25 marks)
- 1.2 List specific characters in serum electrophoresis which helps to identify a cirrhosis condition. (15 marks)
- 1.3 List four tests use to detect blood glucose level. (20 marks)
- 1.4 Describe the procedure of oral glucose tolerance test. (40 marks)

QUESTION 02

(100 marks)

- 2.1. List the components of renal function test. (25 marks)
- 2.2. A patient report shows a normal plasma level of gamma- Glutamyl Transferase (GGTP) with elevated Alkaline phosphatase (ALP level). Identify the condition with an explanation. (25 marks)
- 2.3. List the components in clinical examination of a stool sample. (25 marks)
- 2.4. Write a short note on creatinine clearance test. (25 marks)

QUESTION 03

(100 marks)

- 3.1. Mention the personals who are at a higher risk to suffer from thyroid diseases. (15 marks)
- 3.2. Compare and contrast between the symptoms observed in hypothyroidism and hyperthyroidism. (25 marks)
- 3.3. Discuss the factors for the occurrence of thyroid disease during pregnancy. (30 marks)
- 3.4. Write a short note on the importance of thyroid function tests in the laboratory. (30 marks)

QUESTION 04**(100 marks)**

- 4.1. State five types of cardiac investigations. (15 marks)
4.2. Write a short note on the importance of cardiac markers. (30 marks)
4.3. Differentiate between normal aging and disease conditions. (25 marks)
4.4. Discuss the effect of considering age on laboratory testing. (30 marks)

QUESTION 05**(100 marks)**

- 5.1. List the common causes of subfertility. (10 marks)
5.2. State the feedback loop inhibition of the sex hormone with an example. (20 marks)
5.3. Briefly explain the function of Follicle-stimulating hormone (FSH) in male and female. (30 marks)
5.4. Describe laboratory tests that could be performed to evaluate the infertility of a couple. (40 marks)

QUESTION 06**(100 marks)**

- 6.1. List 03 causes of raised gammaglutamyl transferase? (10 marks)
6.2. Define the following: (10 marks)
a. Lymphocytopenia
b. Eosinophilla
6.3. Compare between Microcytic, Normocytic and Macrocytic Anemia. (20 marks)
6.4. Briefly explain the role of Dihydrotestosterone (DHT) in benign prostatic hyperplasia (BPH). (15 marks)
6.5. Explain the mechanism of Dihydrotestosterone (DHT) in benign prostatic hyperplasia (BPH). (20 marks)
6.6. Explain how to differentiate benign prostatic hyperplasia and prostatic cancer via prostate-specific antigen (PSA). (25 marks)



Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Sciences
BMS 4223 Laboratory Management
Batch – 02 & 03
4th Year 2nd Semester
End Semester SEQ Examination

Date : 02nd of January 2024
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)

All organizations have a management structure that determines relationships between functions and positions and subdivides and delegates roles, responsibilities, and authority to carry out defined tasks.

- 1.1 Create a detailed organizational diagram for the laboratory complex. (25 marks)
- 1.2 Briefly describe the roles and responsibilities of laboratory management and laboratory staff. (20 marks)
- 1.3 State four types of laboratories and state how testing laboratories differ from calibration laboratories. (20 marks)
- 1.4 State three laboratory policies and explain how policies promote the efficiency of the laboratory. (20 marks)
- 1.5 State three factors that need to be considered when designing a laboratory. (15 marks)

Question 02

(100 marks)

- 2.1 State three different types of physical resources in a laboratory. (15 marks)
- 2.2 State two calibration parameters for the biosafety cabinet and autoclave. (20 marks)
- 2.3 Briefly describe the difference between internal calibration and external calibration. (25 marks)

2.4 Briefly mention three factors for efficient chemical storage. (15 marks)

2.5 Briefly describe the significance of the autoclave's safety valve. (25 marks)

Question 03

(100 marks)

Solutions are usually prepared by dissolving a certain amount of a solute in a particular solvent and it is often convenient to prepare stock reagent solutions in a concentrated form and then dilute them for use in particular experiment.

3.1.1 Calculate the grams of Benzoquinone to make 0.5 liters of 0.25 moldm⁻³ of stock solution of Benzoquinone. (Benzoquinone has a molecular weight of 108 g/mol) (25 marks)

3.1.2 Calculate the dilution factor if 2.5 mL of a stock solution is combined with 7.5 mL of suitable solvent. (10 marks)

3.1.3 Calculate the diluted final concentration of the solution in ppb. (20 marks)

Hint: (1000 ppb = 1mg/L)

3.1.4 According to the material safety data sheet, benzoquinone is highly toxic if swallowed or inhaled. Comment on the precautionary methods that can be followed when handling benzoquinone. (25 marks)

3.2 Laboratory data can be classified as qualitative or quantitative data. Provide two examples of qualitative and quantitative data from a laboratory experiment. (20 marks)

Question 04

(100 marks)

4.1 State the reasons for leading to a cancellation of laboratory test (10 marks)

4.2 Describe 3 components of analytical phase to monitor for ensuring the reliability of results. (30 marks)

4.3 Describe the patient's rights which covered by Patient's Bill of Rights. (30 marks)

4.4 What are the post analytical activities carried out within below laboratories.

4.4.1 Microbiology Laboratory (10 marks)

4.4.2 Histopathology Laboratory (10 marks)

4.4.3 Molecular biology Laboratory (10 marks)

Question 05

(100 marks)

5.1 Identify each component of section A,B, C & D and describe the purpose within a Hematology laboratory report.

The image shows a hematology laboratory report from 'imgLabs'. The report is divided into four sections labeled A, B, C, and D on the right side.

- Section A:** The header of the report, including the 'imgLabs' logo, contact information, and accreditation logos.
- Section B:** The patient information section, including name, age, sex, and other identifying details.
- Section C:** The main body of the report, containing a table of test results. The table has columns for 'Test Name', 'Result', 'Reference Range', 'Units', and 'Method'. It lists various hematology tests such as Hemoglobin, Hematocrit, Hemoglobin A1c, etc., with their respective values and reference ranges.
- Section D:** The footer of the report, including a signature, date, and page number.

Question 06

(100 marks)

6.1 Define pre-analytical phase.

(10 marks)

6.2 Describe the source of variations and quality indicators of below stages in pre-analytical phase.

6.2.1 Test ordering

(15 marks)

6.2.2 Patient preparation

(15 marks)

6.2.3 Sample collection, storage

(15 marks)

6.2.4 sample transportation & processing

(15marks)

6.3 Describe actions to be taken to minimise pre analytical errors.

(30 marks)



Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Sciences

BMS 4233 – Applied Biochemistry

4th year 2nd semester – Batch 1

End Semester SEQ Examination

Date : 09th January 2023
 Time : 9.00 a.m. to 12.00 p.m.

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
 - Answer **ALL** questions.
 - You should write answers in lined papers legibly in black or blue ink.
 - You are not allowed to take out the examination papers.
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- | | |
|---|--------------------|
| Question 1 | (100 marks) |
| 1.1. What is oral glucose tolerance test? | (20 marks) |
| 1.2. Write two indications of OGTT. | (20 marks) |
| 1.3. Describe the procedure of OGTT. | (30 marks) |
| 1.4. Describe criteria you have to consider when collect stool samples to diagnose parasitic infections. | (30 marks) |
| Question 2 | (100 marks) |
| 2.1. What is the diagnostic importance of following markers? | |
| 2.1.1 Alanine aminotransferase | (20 marks) |
| 2.1.2 Albumin | (20 marks) |
| 2.2. What are potential diagnosis conditions when lab report contains following details? | |
| 2.2.1 Normal plasma level of gamma- Glutamyl Transferase (GGTP) with elevated Alkaline phosphatase (ALP level). | (15 marks) |
| 2.2.2 Elevated plasma level of GGTP and elevated ALP. | (15 marks) |
| 2.3. Name two conditions where Bence Jones protein are appeared in urine. | (10 marks) |
| 2.4. List the components of renal function test. | (20 marks) |

Question 3**(100 marks)** 00033

Mr A 65, yrs old retired male person presented to a medical laboratory for routine investigations requested by a general practitioner. Phlebotomist obtains several blood samples from Mr A.

- 3.1 List the Instruments and required chemical to obtain blood samples. (15 marks)
- 3.2 List possible investigation would be requested by General Practitioner. (20 marks)
- 3.3 Describe how you obtain blood sample to test serum calcium level. (25 marks)
- 3.4 Discusses alternative investigations for screening for Mr A instead of blood tests with examples. (40marks)

Question 4**(100 marks)**

- 4.1. Complete below table with possible of Thyroid functional status. (45 marks)

	Normal T4	High T4	Low T4
Normal TSH			
High TSH			
Low TSH			

- 4.2. Mrs B presented with Thyroid gland enlargement. How do you screen her disease only from hormone analysis? (30 marks)

- 4.3. What are investigations could be carried out other than hormone analysis? (25 marks)

Question 5**(100 marks)**

A married couple has referred by a doctor for the investigation for subfertility.

- 5.1. How do you investigate male partner if his sperm full report findings are normal? (35 marks)
- 5.2. How do you investigate female partner who has no structural abnormalities in reproductive system? (35 marks)
- 5.3. What are possible causes for sub fertility? (30 marks)

Question 6**(100 marks)**

Mr X is inward patient with myocardial infarction.

- 6.1. What are diagnostic cardiac biomarkers? (20 marks)
- 6.2. Mention different bio markers with time durations for the diagnosis. (30 marks)
- 6.3. Discuss the advantage and disadvantage, use of cardiac biomarkers in ischemic heart disease. (30 marks)
- 6.4. Briefly explain different types of body fluids analysis of the above patient. (20 marks)

Faculty of Health Sciences
BSc (Hons) in Biomedical Science
Laboratory Management - BMS 4223
4th year 2nd semester –Batch 01
End Semester Examination- SEQ Examination

Date : 04.01.2023
Time : 09.00 am – 12.00 am (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 Draw a complete organizational diagram for a medical laboratory complex. (25 marks)
- 1.2 State five topics that are contained in a standard operating procedure. (25 marks)
- 1.3 State four types of laboratory waste and briefly describe two disposal methods of Laboratory waste. (25 marks)
- 1.4 Briefly describe the responsibilities of a medical laboratory analyst. (25 marks)

Question 02 **(100 marks)**

- 2.1 State three types of physical resources in a laboratory (15 marks)
- 2.2 State two calibration parameters for the hot air oven and autoclave (20 marks)
- 2.3 State two types of documents related to laboratory equipments. (20 marks)
- 2.4 State two types of glassware apparatus in a laboratory. (20 marks)
- 2.5 Briefly describe the importance of the biosafety cabinet in the analysis of biohazardous materials. (25 marks)

Question 03 **(100 marks)**

3.1 Ferric ions forms a stable complex with thiocyanate to give absorbance value as 0.0354 at 480 nm.
($\epsilon = 0.177 \text{ mol}^{-1}\text{dm}^3\text{cm}^{-1}$ and $l = 1 \text{ cm}$)

- i. By using the given equation find the concentration of the complex (mol dm^{-3})

$$A = \epsilon C l$$

A - Absorbance

ϵ - Molar absorptivity coefficient

C - Molar concentration

l - Length of the cuvette

- ii. The student has decided to dilute the above sample to 0.02 mol dm^{-3} . Calculate the dilution factor for the experiment.

(40 marks)

3.2 Do the necessary calculation to prepare 6.0 mol dm^{-3} of HCl in 4L from a stock solution of 35.4 % (V/V) in 3.0 L

(M.W. of HCl - 36.46 gmol^{-1} and the density of HCl - 1.2 g/ml) (30 marks)

3.2.1 State the necessary precautions when handling corrosive chemicals. (10 marks)

3.3 Laboratory data can be classified as qualitative or quantitative data. Provide two examples of qualitative and quantitative data from a laboratory experiment. (20 marks)

Question 04 (100 marks)

4.1 State different laboratory managerial duties and responsibilities (25 marks)

4.2 Describe the four basic elements of Laboratory Management. (35 marks)

4.3 Describe an Administration Model diagram which laboratory managers follow, by illustrating Inputs, outputs and effecting factors. (40 marks)

Question 05 (100 marks)

5.1 Define record retention (10 marks)

5.2 What are the elements of a patient order form for a test? (20 marks)

5.3 Describe 3 components of analytical phase to monitor for ensuring the reliability of results. (30 marks)

5.4 State the features of Standard Operating Procedures. (10 marks)

5.5 Describe the patient's rights which covered by Patient's Bill of Rights. (30 marks)

Question 06 (100 marks)

Mr. Jayawardana, laboratory manager of a newly established only clinical laboratory based in a rural area of Sri Lanka. He recently conducted a SWOT analysis and discovered that recent power outages, the current economic crisis, a lack of trained staff, the absence of a staff information system, and the results of his laboratory all contributed to the SWOT analysis.

5.1 What is a Laboratory Information Management System (LIMS)? (15 marks)

5.2 State the purposes of LIMS. (15 marks)

5.3 Describe a possible SWOT (Strength, Weakness, Opportunity, Threats) analysis by Mr. Jayawardana. (35 marks)

5.4 How the cost-effective management ensured within this clinical laboratory? (35 marks)

Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Science
Immunobiology - BMS 4213
4th year 2nd semester –Batch 01
End Semester Examination- SEQ Examination



Date : 02.01.2023
Time : 09.00 am – 12.00 am (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 Describe Innate and Adaptive immune system. (25 marks)
- 1.2 Classify the Innate and adaptive immune systems with examples. (25 marks)
- 1.3 State three types of phagocytic cells. (15 marks)
- 1.4 Describe the mechanism process of phagocytosis via an illustration. (35 marks)

Question 02 (100 marks)

- 2.1 Describe the below terms. (100 marks)
- 2.1.1 Naturally Acquired Immunity.
- 2.1.2 Naturally Acquired Active Immunity.
- 2.1.3 Naturally Acquired Passive Immunity.
- 2.1.4 Artificially Acquired Immunity.
- 2.1.5 Artificially Acquired Active Immunity.

Question 03 (100 marks)

- 3.1 Define the Complement system. (15 marks)
- 3.2 Describe types of complement system. (30 marks)
- 3.3 Describe the process of membrane attack complex (MAC). (20 marks)
- 3.4 Describe the one of complement pathway along with the illustration. (35 marks)

- Question 04** (100 marks)
- 4.1 Define the below terms. (20 marks)
- 4.1.1 Antigen
 - 4.1.2 Antibody
 - 4.1.3 Antigenicity
 - 4.1.4 Immunogenicity
- 4.3 State the types of immunoglobulins involved in the humoral immunity. (20 marks)
- 4.4 State two types of Major Histocompatibility complexes. (30 marks)
- 4.5 Describe the immune pathway which activate with T lymphocyte and Antigen presenting cell (APC) binding. (30 marks)
- Question 05** (100 marks)
- 3.1 Describe the Primary vaccination and the booster vaccination. (25 marks)
- 3.2 State the routes of vaccine administration with examples. (25 marks)
- 3.3 State the five types of vaccinations. (25 marks)
- 3.4 Write the short notes. (25 marks)
- 3.4.1 Live vaccines
 - 3.4.2 Inactivated vaccines.
- Question 06** (100 marks)
- 6.1 Define the term "Transplantation". (25 marks)
- 6.2 Briefly describe the two types of transplantation. (25 marks)
- 6.3 Briefly describe the transplantation rejection take place via, (50 marks)
- 6.3.1 Direct presentation (or direct recognition) of alloantigens by T cells.
 - 6.3.2 Indirect presentation (or indirect recognition) by T cells.