NZIMLS EXAMINATION FOR QUALIFIED MEDICAL LABORATORY TECHNICIAN

BIOCHEMISTRY
2025

Part 1: Common Syllabus

Part 2: Discipline Specific Syllabus

Candidate Name: «Name»

Candidate No.: «Member_No»

General Instructions

1. Total marks for paper = 100.

2. Marks for each question are as indicated.

3. The paper consists of:

	Common	*Discipline Specific*
Part 1:		
Section A; questions 1-30	6 Marks	9 Marks
Section B; questions 31-34	5 Marks	
Section C; questions 35-36	4 Marks	
Section D; questions 37-39	5 Marks	
Section E; questions 40-45	10 Marks	
Total Part 1:	*30 Marks*	*9 Marks*
Part 2:		
Section A; questions 46-50		6 Marks
Section B; questions 51-52		5 Marks
Section C; questions 53-62		30 Marks
Section D; questions 63-64		20 Marks
Total Part 2:		*61 Marks*

4. All questions are to be attempted.

5. Use of calculator is permitted.

6. Put all answers into the examination booklet provided.

WORD DEFINITIONS	
Calculate	Perform a mathematical process to get the answer
Classify	Be able to designate to a group
Compare	Detail both the differences and the similarities
Complete	Finish, have all the necessary parts
Convert	Express in alternative units
Define	State meaning clearly and concisely
Describe	Give a complete account demonstrating a thorough practical knowledge
Discuss	Give details, explaining both the positives and negatives
Distinguish	To briefly point out the main differences
Expand	To express at length or in a greater detail
Identify	Recognise according to established criteria
Indicate	Briefly point out
Interpret	Express the results of a test or series of tests in a meaningful format
Label	Give a name to
List	Headings only
Match	Find one that closely resembles another
Name	A word or group of words used to describe or evaluate
Outline	Write brief notes incorporating the essential facts
State	Give the relevant points briefly

Part 1

	Common	*Discipline Specific*
Section A; questions 1-30	6 Marks	9 Marks
Section B; questions 31-34	5 Marks	
Section C; questions 35-36	4 Marks	
Section D; questions 37-39	5 Marks	
Section E; questions 40-45	10 Marks	
Total Part 1:	*30 Marks*	*9 Marks*

PART 1: SECTION A – COMMON AND DISCIPLINE SYLLABUS MULTI CHOICE QUESTIONS

Multi Choice Questions 1 – 30

Instructions: Multi-choice questions – circle one answer for each question. If you make a mistake, clearly cross-out the incorrect answer and circle your new choice.

Marks: 0.5 per correct answer

Total Marks: 15

Example: *Which of the below is a primary colour?*

a. *Green*

b. *Purple*

c. *Red*

d. *Orange*

C1. The prefix “hypo” refers to:

a. Reduced

b. Raised

c. Absent

d. Removed

C2. Olecranon bursitis is associated with which body joint?

a. Shoulder

b. Knee

c. Hip

d. Elbow

C3. Which organs are responsible for removing toxins from the human body?

a. Liver and Stomach

b. Kidney and Stomach

c. Heart and Stomach

d. Liver and Kidneys

C4. Annual Practicing Certificates are issued by:

a. Medical Sciences Council of New Zealand

b. The New Zealand Institute of Medical Laboratory Science (Inc.)

c. IANZ

d. Te Whatu Ora – Health New Zealand

C5. Principles that govern the right behaviour are:

a. Standards

b. Methods

c. Criteria

d. Ethics

C6. A lavender top blood tube contains which anti-coagulant?

a. Sodium fluoride

b. Ethylenediaminetetraacetic Acid

c. Sodium citrate

d. Heparin

C7. Test and tag is a requirement for:

a. First Aid training

b. Fire safety

c. Electrical safety

d. Biohazard safety

C8. Vitreous fluid is taken from:

a. Eye

b. Joint

c. Artery

d. Lumbar puncture

C9. Formalin is a solution primarily used in which laboratory department?

a. Biochemistry

b. Haematology

c. Blood Bank

d. Histology

C10. Which guidelines are used as industry standard for specimen transport?

a. NATA guidelines

b. H&S guidelines

c. IATA guidelines

d. IANZ guidelines

C11. Laboratory computer systems have personalised logins to ensure that:

a. HR know when staff are working

b. Management can track individual staff KPI's

c. Computer entries can be appropriately tracked

d. Errors are logged appropriately

C12. Getting permission from a patient to proceed with a test is best described as:

a. Informed consent

b. Patient confidentiality

c. Cultural competence

d. Patient information

D13. In general, elevated levels of C – Reactive Protein (CRP) is caused by:

a. Vitamin D deficiency

b. Dehydration

c. Hypercalcemia

d. Inflammation and infection

D14. High levels of Troponin T or I in the blood are commonly associated with:

a. Chronic renal disease

b. Cardiac infarction

c. Liver disease

d. Multiple myeloma

D15. PSA elevation is often associated with?

a. Prostate cancer

b. Lung cancer

c. Heart failure

d. Hyperthyroidism

D16. Which of the following drugs is used to treat heart failure?

a. Vancomycin

b. Acetaminophen

c. Digoxin

d. Carbamazepine

D17. Which of the following analytes is most affected by haemolysis?

a. Potassium

b. Chloride

c. Sodium

d. Calcium

D18. Which anticoagulant is used in a grey tube for glucose testing?

a. EDTA

b. Heparin

c. Potassium oxalate sodium fluoride

d. Citrate

D19. Which of the following hormones primarily regulates calcium and phosphate levels?

a. Parathyroid hormone

b. Free thyroxine

c. Free triiodothyronine

d. Human chorionic gonadotrophin

D20. What is the principle for a spectrophotometer?

a. Separation of ions by electric field

b. Measurement of electrical potential

c. Measurement of light absorbance by solutions

d. Counting of cells by impedance

D21. Which organ system is primarily assessed using the Liver Function Test (LFT)?

a. Respiratory system

b. Digestive system

c. Cardiovascular system

d. Endocrine system

D22. Which of the following tests is the most specific to assess Kidney injury?

a. Glucose

b. Troponin I or/and T

c. Urea

d. Creatinine

D23. Which method below is used to measure pH?

a. Immunoassay

b. Ion selective electrode

c. Flame photometry

d. Nephelometry

D24. Which set of biochemical tests are used to assess the thyroid function?

a. Troponin I and/or T and BNP

b. ALT, AST, GGT and ALP

c. Electrolytes, urea and creatinine

d. TSH, FT3 and FT4

D25. What does ALT indicate when it is elevated?

a. Liver damage

b. Renal damage

c. Heart damage

d. Pancreas damage

D26. Which hormone is measured to evaluate pregnancy?

a. Prostate specific antigen (PSA)

b. Parathyroid hormone

c. Pro BNP / BNP

d. Human chorionic gonadotrophin (hCG)

D27. Which of the following is NOT a typical method to purify laboratory water?

a. Ion exchange

b. Reverse osmosis

c. Evaporation

d. Distillation

D28. Which of the following metabolites is most associated with liver function?

a. Creatinine

b. Bilirubin

c. Uric acid

d. Urea

D29. What is a common cause of falsely decreased bilirubin levels in a sample?

a. Insufficient sample volume

b. Use of EDTA

c. Inhomogeneous sample

d. Exposure to light

D30. Which of the following is measured using an ion–selective electrode?

a. Glucose

b. Urea

c. Sodium

d. Triglycerides

Total marks: 15

END OF PART 1, SECTION A

PART 1, SECTION B – COMMON SYLLABUS QUESTIONS

Labelling of diagrams e.g. anatomy, hazard identification, instrument

Questions 31 – 34

Total Marks: 5

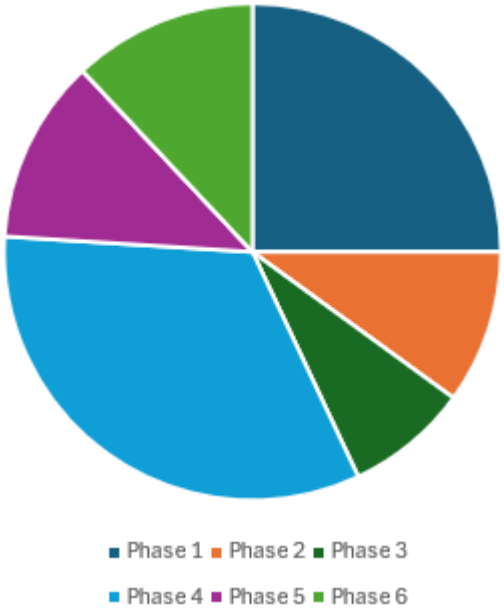
C31. Name the following hazard symbols: (2 marks)
(0.5 mark per correct answer)

a.		b.	
c.		d.	

a. _____ b. _____

c. _____ d. _____

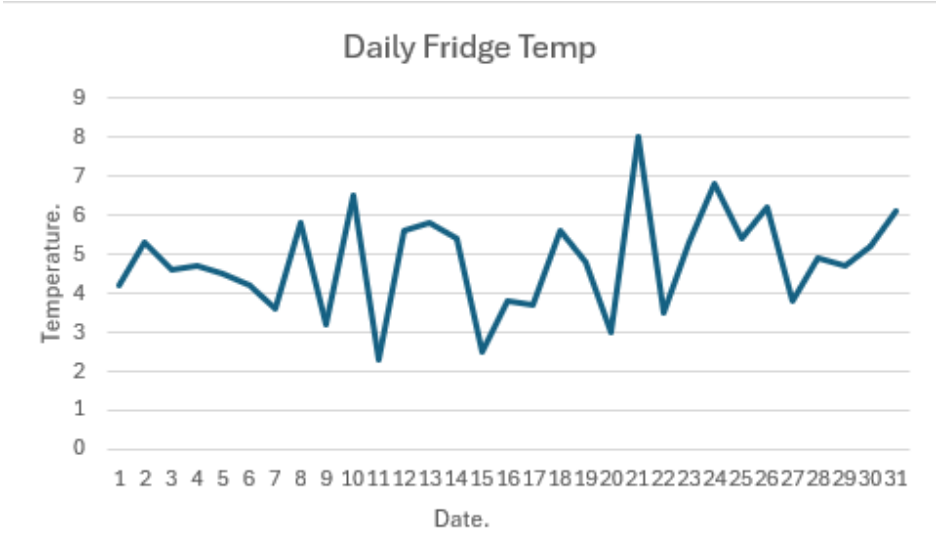
C32. Name the type of graph pictured below: (1 mark)



Type of graph: _____

What is the approximate percentage of the chart that is phase 1? _____

C33. Name the type of graph pictured below: (1.5 marks)



Type of graph: _____

Name the axis: Temperature = _____ Date = _____

C34. Name the piece of equipment pictured below: (0.5 mark)

Total marks: 5

END OF PART 1, SECTION B

PART 1, SECTION C – COMMON SYLLABUS QUESTIONS

Tables, match column definition

Section C – Questions 35 to 36

Total marks: 4

C35. Match the columns by **writing the Roman numeral from the test list in Column B** against the correct match in Column A. (2.5 marks)

Column A	Column B
a. Microtome	i. Inflammatory marker
b. C Reactive Protein	ii. Coagulation
c. Prothrombin time	iii. Foetal Red Cells
d. Polymerase Chain Reaction	iv. Molecular technique
e. Kleihauer test	v. Histology

Column A	Column B
a. Microtome	
b. C Reactive Protein	
c. Prothrombin time	
d. Polymerase Chain Reaction	
e. Kleihauer test	

C36. Expand the common abbreviations: (1.5 marks)

A.	B.
a. CKD	
b. DKA	
c. AML	

Total marks: 4

END OF PART 1, SECTION C

PART 1, SECTION D – COMMON SYLLABUS QUESTIONS

Calculations

Section D – Questions 37 to 39

Total marks: 5

C37. (2 marks)

a. A 200 µL pipette is due for calibration. 5 aliquots of deionised water were taken and weighed. The results are below.

I. 0.2015 gm
II. 0.2018 gm
III. 0.2009 gm
IV. 0.2002 gm
V. 0.2011 gm

Calculate the average weight of the aliquots taken?
(Show all calculations) *(1 mark)*

b. Calculate the percentage variance of the mean from the desired 200 µL?
(Show all calculations) *(1 mark)*

C38. Convert the following: (2 marks)

1.5 mL	to	_____	µL
3/8	to	_____	%
0.25 kg	to	_____	mg
7.5 cm	to	_____	mm

C39. How many millilitres of alcohol is required to make 2.0 litres of a 70% alcohol bench wash solution? (1 mark)

_____

Total marks: 5

END OF PART 1, SECTION D

PART 1, SECTION E – COMMON SYLLABUS QUESTIONS

Short answer questions (answers = one or more words, short sentences)

Section E – Questions 40 to 45

Total marks: 10

C40. Define a notifiable incident according to the Health and Safety at Work Act 2015. (1.5 marks)

C41. Describe the theory and laboratory procedure of decontamination of biohazards and infectious agents in the laboratory. (2.5 marks)

C42. Define patient confidentiality. (1.5 marks)

C43. Define the ISO 15189 standard, what is its function and who it is administered by in New Zealand. (1.5 marks)

C44. Describe precautions taken to ensure safety and security of laboratory data. (1.5 marks)

C45. Define the concept of safe practice within the laboratory. (1.5 marks)

Total marks: 10 marks

END OF PART 1, SECTION E

END OF PART 1

Part 2

Discipline specific	
Section A; questions 46-50	6 Marks
Section B; questions 51-52	5 Marks
Section C; questions 53-62	30 Marks
Section D; questions 63-64	20 Marks
Total Part 2:	*61 Marks*

PART 2, SECTION A – DISCIPLINE SYLLABUS QUESTIONS

Labelling of diagrams e.g. anatomy, hazard identification, instrument

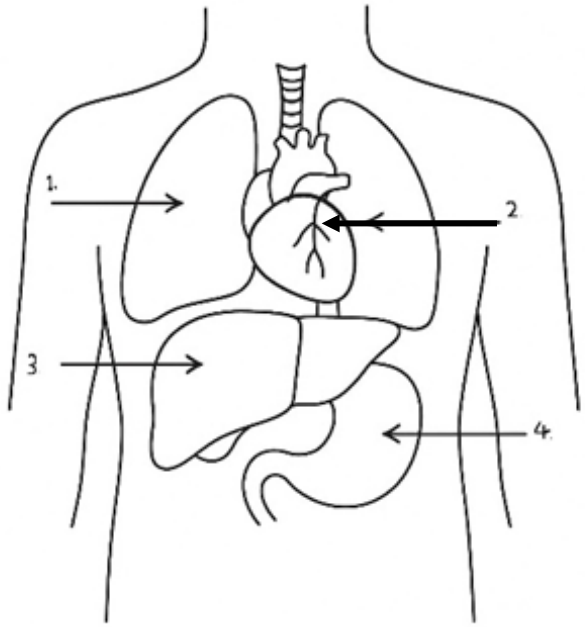
Questions 46 – 50

Total Marks: 6

D46. Name the following hazard symbols: (1 mark)

D47. Name the following hazard symbols: (1 mark)

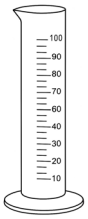
D48. Name the four organs in the diagram below: (2 marks)



1. _____ 3. _____

2. _____ 4. _____

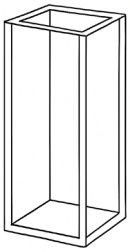
D49. Name the laboratory equipment below: (1 mark)



_____

_____

D50. Name the laboratory equipment below: (1 mark)



_____

_____

Total marks: 6 marks

END OF PART 2, SECTION A

PART 2, SECTION B – DISCIPLINE SYLLABUS QUESTIONS

Tables, match column definition

Questions 51 to 52

Total marks: 5

D51. Match the columns by writing the **Roman numeral from the test list in Column B against the correct match in Column A.** (2.5 marks)

Column A	Column B
a. Renal failure	i. Glucose and beta - hydroxybutyrate
b. Inflammation and/or infection	ii. Creatinine
c. Pancreatitis	iii. Iron
d. Diabetic ketoacidosis	iv. CRP
e. Cholelithiasis	v. Amylase and Lipase

Column A	Column B
a. Renal failure	
b. Inflammation and/or infection	
c. Pancreatitis	
d. Diabetic ketoacidosis	
e. Iron Deficiency Anaemia	

D52. Match the columns by writing the **Roman numeral from the test list in Column B against the correct match in Column A.** (2.5 marks)

Column A	Column B
a. Viral hepatitis	i. Parathyroid hormone and calcium
b. Dehydration	ii. ALT and AST
c. Epilepsy	iii. Vancomycin
d. Hypocalcaemia	iv. Electrolytes
e. MRSA	v. Carbamazepine

Column A	Column B
a. Viral Hepatitis	
b. Dehydration	
c. Epilepsy	
d. Hypocalcaemia	
e. MRSA	

Total marks: 5 marks

END OF PART 2, SECTION B

PART 2, SECTION C – DISCIPLINE SYLLABUS QUESTIONS

Short answer questions (answers = one or more words, short sentences)

Questions 53 to 62

Total marks: 30

D53. List **THREE (3)** common interferences in spectrophotometric analysis and explain how they can affect results. (3 marks)

D54. Briefly describe TDM and outline pharmacokinetics and pharmacodynamics. (3 marks)

D55. ‘Outline’ the principles of spectrophotometry and how it is used in biochemistry. (3 marks)

D56. ‘Outline’ **THREE (3)** pre-analytical factors that can affect biochemical results. (3 marks)

D57. ‘Outline’ the role of insulin and glucagon in glucose regulation. (3 marks)

D58. Name **THREE (3)** biochemical analytes affected by haemolysis and briefly explain why. (3 marks)

D59. List **SIX (6)** factors that can affect enzyme activity in a biochemical reaction. (3 marks)

D60. List **SIX (6)** analytes included in a liver function test panel and briefly describe the clinical significance of each. (3 marks)

D61. List **SIX (6)** tests included in the renal function test panel and their purpose. (3 marks)

D62. List **THREE (3)** analytes included in a routine electrolyte panel and briefly state their importance. (3 marks)

Total marks: 30 marks

END OF PART 2, SECTION C

PART 2, SECTION D – DISCIPLINE SYLLABUS QUESTIONS

Essays

Questions 63 to 64

Total marks: 20

D63. In essay format, describe the principles of nephelometry and turbidimetry and describe the differences between them. (10 marks)

D64. In essay format, describe the principle of immunoassay, choose **THREE (3)** analytes analysed by this method and describe their significance. (10 marks)

Total marks: 20 marks

END OF PART 2, SECTION D

END OF PAPER

EXTRA PAPER

Question #	Answer