EXAMINATION FOR QUALIFIED MEDICAL LABORATORY TECHNICIAN

Candidate Name:

Candidate Number:

Subject: **GENERAL**

Examination Date: **8 October 2022**

Time Allowed: **3 hours – 9.30am – 12.40pm**
10 minutes extra time for reading the paper

General Instructions

1. Total marks for paper = 100.

2. Marks for each question are as indicated,

3. The paper consists of:

	Common	*Discipline Specific*
Section A, questions 1-30 = Total Marks 15	*6 Marks*	*9 Marks*
Section B, questions 31-37 = Total Marks 10	*5 Marks*	*5 Marks*
Section C, questions 38-40 = Total Marks 10	*4 Marks*	*6 Marks*
Section D, questions 41-44 = Total Marks 05	*5 Marks*	*0*
Section E, questions 45-64 = Total Marks 40	*10 Marks*	*30 Marks*
Section F, questions 65-66 = Total Marks 20	*0*	*20 Marks*

4. All questions are to be attempted.

5. Use of calculator is permitted.

6. Put all answers into the examination booklet provided.

«Member_No»

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

SECTION A

Section A – Question 1 to Question 30 = Total Marks: 15

Multi choice questions

Multi choice questions – choose one answer for each question

(0.5mark per correct answer)

Circle the letter for the correct answer

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

a. Green
b. Purple
c. Red
d. Orange

C.1 Approximately what percent alcohol is in a standard use hand sanitiser?

a. 95%
b. 75%
c. 30%
d. 10%

C.2 The patella is part of which human joint?

a. Shoulder
b. Elbow
c. Knee
d. Wrist

C.3 An anticoagulant is used to:

a. stop blood clotting
b. stop blood haemolysing
c. help blood separating
d. separate red cells and plasma

C.4 Which of the following is **NOT** listed in the Health and Safety at Work Act 2015 as "Duties of Workers"?

a. take reasonable care for his or her own health and safety

b. take reasonable care that his or her acts or omissions do not adversely affect the health and safety of other persons

c. co-operate with any reasonable policy or procedure of the PCBU (person conducting a business or undertaking) relating to Health and Safety at the workplace that has been notified to workers

d. issue provisional improvement notices

C.5 Which of the following statements is true of an acidic solution?

a. has a pH less than 7

b. is caustic

c. has a pH greater than 7

d. is Isotonic

C.6 The reference interval for a given test is based on the results that are seen in what percent of the healthy population?

a. 5%

b. 10%

c. 90%

d. 95%

C.7 Treating all blood and body fluids as potentially infectious is an example of:

a. Laboratory standard operating procedures

b. CDC guidelines

c. Standard precautions

d. Health and safety requirements

C.8 Which laboratory department is primarily responsible for the diagnosis of leukaemia?

a. Haematology

b. Histology

c. Blood Transfusion

d. Biochemistry

C.9 Hormones are produced by which bodily system?

a. Lymphatic
b. Cardiovascular
c. Endocrine
d. Digestive

C.10 Formalin is a laboratory fluid used to

a. Preserve tissue samples
b. Wash histology cutting knives
c. Clean benches
d. Decontaminate centrifuges

C.11 A chemical that is described as a carcinogen poses what specific risk?

a. It may burn the skin
b. It may cause cancer
c. It may poison the liver
d. It may cause loss of vision.

C.12 The practice of enforcing document management standards within the workplace is referred to as:

a. Quality management
b. Quality control
c. IANZ requirements
d. Document control

D.13 What is the Gram stain morphology of *Staphylococcus aureus*?

a. Gram negative cocci
b. Gram positive diplococci
c. Gram positive bacilli
d. Gram positive cocci

D.14 If a patient is believed to be A Rh D positive, what group may they be transfused in an emergency situation?

a. Group A Rh D negative

b. Group O Rh D negative

c. Group AB Rh D positive

d. Group A Rh D positive

D.15 What is the optimal number of tubes of cerebrospinal fluid (CSF) expected to be received by the laboratory for microscopy and culture?

a. 6

b. 1

c. 3

d. 2

D.16 Which of the following staining methods is used to stain a blood film for haematological analysis?

a. Romanowsky

b. PAS

c. Haematoxylin and Eosin

d. Gram

D.17 Where are the adrenal glands located?

a. In the liver

b. On top of the kidneys

c. In the neck

d. At the base of the skull

D.18 Which of the following is the only sample suitable for coagulation testing?

a. Lavender

b. Blue

c. Pink

d. Green

D.19 Which of the following coagulation factors is part of the **extrinsic** pathway?

a. XI

b. XII

c. V

d. VII

D. 20 Which of the following conditions may be characterised by a reactive lymphocytosis in the peripheral blood film?

a. Epstein Barr Virus Infection

b. Acute Myeloid Leukaemia

c. Pregnancy

d. Myelodysplastic Syndromes

D.21 Which organ may the term **Pericardial** be applied to?

a. Liver

b. Kidney

c. Oesophagus

d. Heart

D.22 Which renal function analyte may be falsely raised if sample is haemolysed?

a. Sodium

b. Creatinine

c. Potassium

d. Urea

D.23 Under which of the following circumstances could a low blood urea level be detected?

a. Pregnancy

b. Active bleeding

c. Dehydration

d. High-protein diet

D.24 When decreased, which of the following parameters indicates microcytosis?

a. MCHC

b. MCH

c. MCV

d. MOH

D.25 Which vitamin is a patient with megaloblastic anaemia deficient in?

a. Vitamin B2

b. Vitamin B6

c. Vitamin B12

d. Vitamin B1

D.26 Which of the following meets the minimum requirements for labelling a sample for Transfusion testing?

a. Hand labelled with patient's Full Name, Date of Birth, NHI and Signature of Collector.

b. A sticky label with patient's Full Name, Date of birth, NHI and signature of collector.

c. Hand labelled with patient Surname, Date of birth and full name of collector.

d. Hand labelled with patient's Full Name, Date of birth and address.

D.27 Which waste bin should be used to discard a used needle?

a. Confidential waste

b. General waste

c. Biohazard waste

d. Sharps waste

D.28 Which waste bin should be used to discard paper with patient identifiable information?

a. General waste

b. Confidential waste

c. Paper waste for recycling

d. Biohazard waste

D.29 Which of the following enzymes is raised in bone disease?

a. Creatine kinase

b. Acid phosphatase

c. Alkaline phosphatase

d. Gamma glutamyl transferase

D.30 Which department uses SurePath™ or ThinPrep™ vials?

a. Cytology

b. Cytogenetics

c. Microbiology

d. Blood bank

END OF SECTION

SECTION B

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

Section B – Question 31 to Question 37 = Total Marks: 10

(Answer all questions)

C.31 Name the following hazard symbols *(0.5 marks per correct answer)*

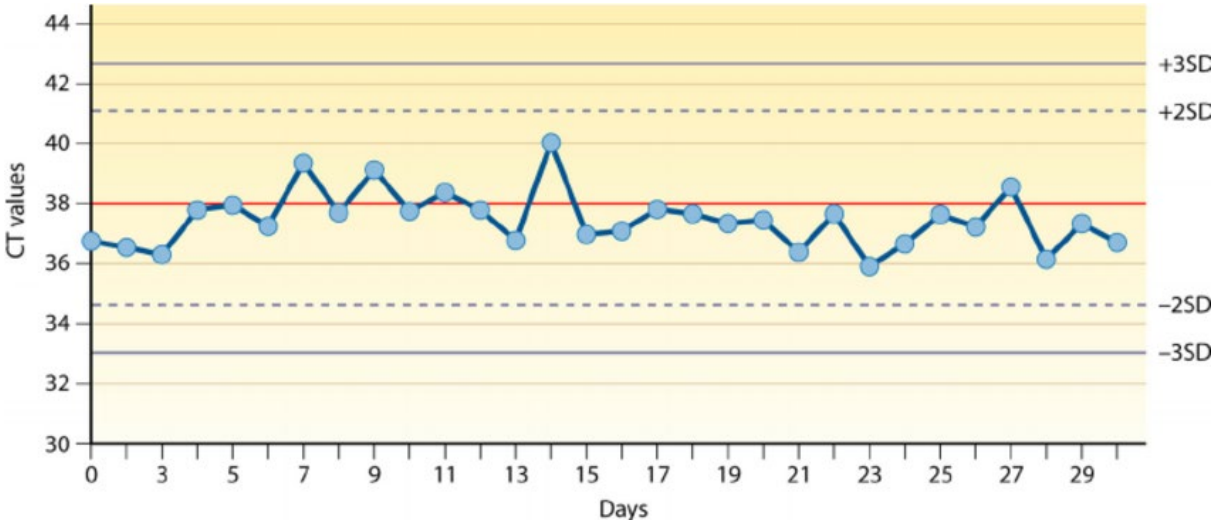
(C.31: 1 mark)

a.		b.	

a. _____ b. _____

C.32 Name the type of graph: *(0.5 marks per correct answer)*

(C.32: 1.5 marks)

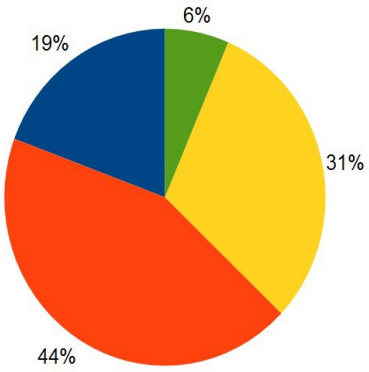


Type of graph: _____

Name the axis: CT values = _____ axis

Days = _____ axis

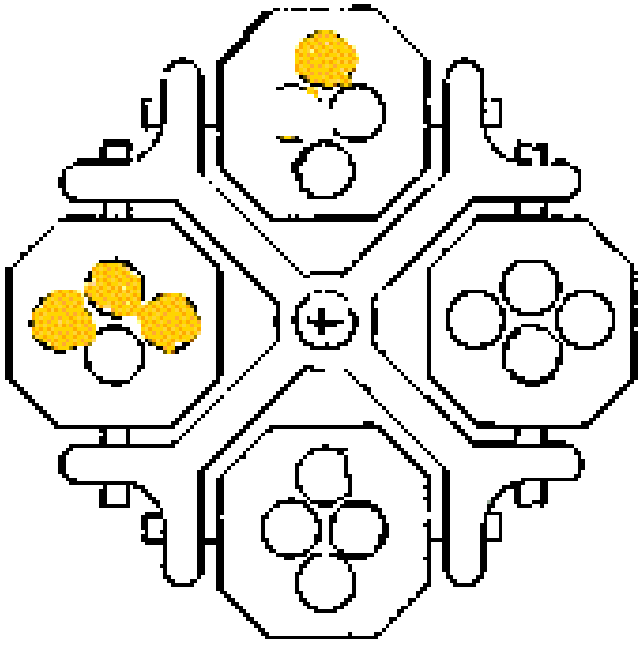
C.33 Name the type of graph **(C.33: 0.5 mark)**



C.34 The yellow dots represent blood tubes in a swing out centrifuge rotor, assume all tubes are filled to the same level.

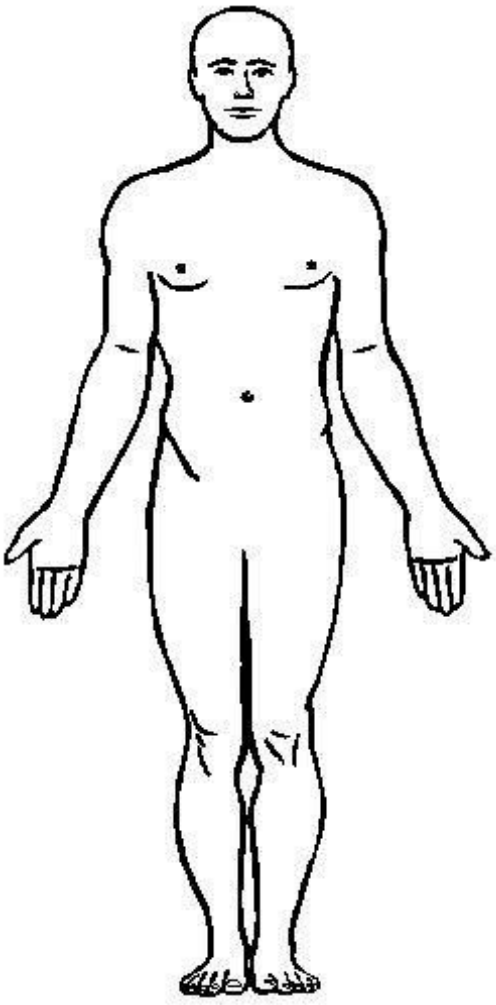
You have 4 more tubes to centrifuge, indicate on the rotor where they need to be positioned.

(C.34: 0.5 mark)

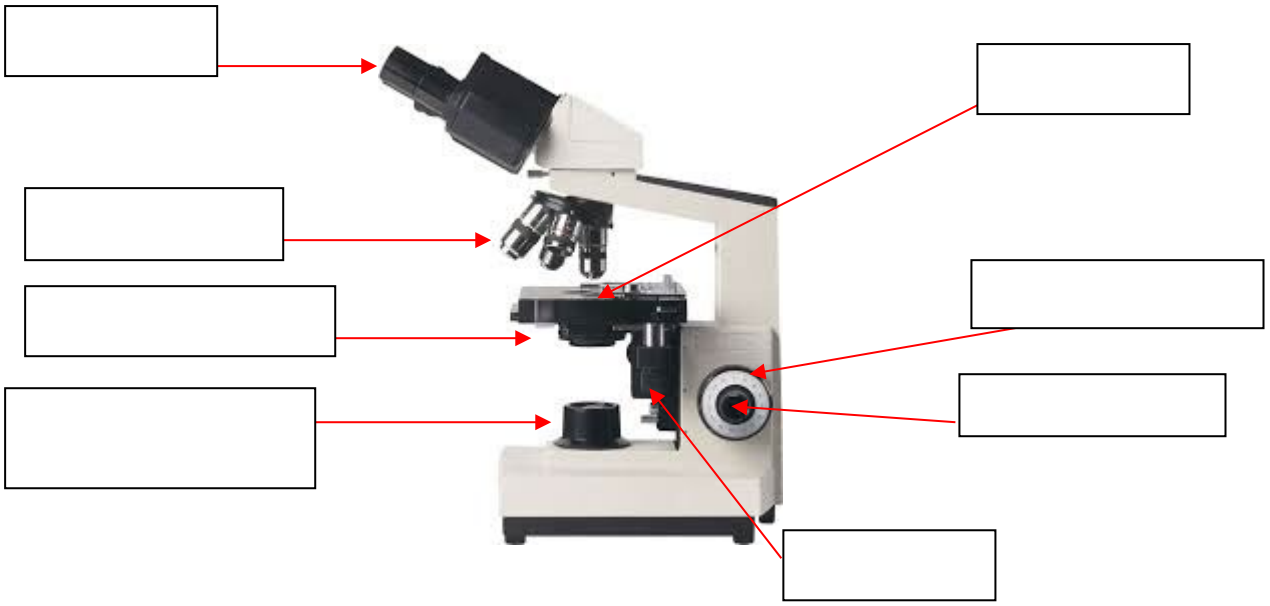


C.35 On the diagram, show the location of the following: **(C.35: 1.5 marks)**

a. Femoral artery
b. Jugular vein
c. Median cubital vein



D.36 Label the parts of the microscope. **(D.36: 4 marks)**



D.37 Name the anticoagulant found in this tube and the department that this tube would be sent to. **(D.37: 1 mark)**

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END OF SECTION

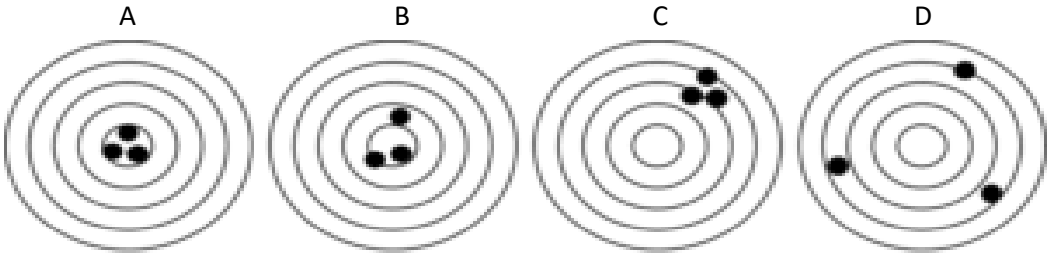
SECTION C

Tables, match column definition

Section C – Question 38 to Question 40 = Total Marks: 10

(Answer all questions)

C.38 Select the correct letter for each description: **(C.38: 2 marks)**



Description Letter

Low Accuracy / High Precision = _____

High Accuracy / Low Precision = _____

Low Accuracy / Low Precision = _____

High Accuracy / High Precision = _____

C.39 Match Column A to Column B, and write your answers in the table below:
(Roman Numerals only required): **(C.39: 2 marks)**

Column A	Column B
Medical Sciences Council	i. Certifies laboratory quality systems
International Accreditation New Zealand	ii. Issues Annual Practising Certificate
New Zealand Institute of Medical Laboratory Science	iii. Patients' rights for service
Health and disability commission	iv. Professional affairs and education

Column A	Column B (Roman numerals only required)
Medical Sciences Council	
International Accreditation New Zealand	
New Zealand Institute of Medical Laboratory Science	
Health and disability commission	

D.40 Match the following list of terms in Column A with the associated term in Column B. Write your answers in the table below. (Roman numeral only required).

(0.5 marks per correct answer)

(D.40: 6 marks)

A	B
a. O_2 saturation (SO_2)	i. Myocardial Infarction
b. Ultraviolet Light	ii. Urinary Tract Infection
c. Heparin Monitoring	iii. Abdominal Aortic Aneurysm
d. MI	iv. Disinfection
e. COVID-19	v. Liver enzymes
f. UTI	vi. Blood film examination
g. Common Pathway	vii. SARS-CoV-2
h. ALT/AST	viii. Blood Gas
i. Tuberculosis	ix. Gram Stain
j. AAA	x. Coagulation Cascade
k. Köhler Illumination	xi. Quantiferon Gold
l. Crystal violet	xii. APTT

A	B **(Roman numerals only required)**
a. O_2 saturation (SO_2)	
b. Ultraviolet Light	
c. Heparin Monitoring	
d. MI	
e. COVID-19	
f. UTI	
g. Common Pathway	
h. ALT/AST	
i. Tuberculosis	
j. AAA	
k. Köhler Illumination	
l. Crystal violet	

END OF SECTION

SECTION D

Calculations

Section D – Question 41 to Question 44 = Total Marks: 5

Calculations

C.41 A Glucose Tolerance Test dose is 75g glucose in 350mL water. This test requires the patient to fast for 12 hours before drinking the solution. A blood test is then collected 120 minutes after the drinking the solution. **(C.41: 1.5 marks)**

a. Calculate the percentage glucose in solution. *(Show working)* *(0.5 mark)*

a. _____

_____

b. If the patient finished their evening meal at 2115 hrs, state the earliest time they can present for the test the following day. *(0.5 mark)*

b. _____

_____

c. If the patient drinks the solution at 1010 hrs, state the time the blood test is required. *(0.5 mark)*

c. _____

_____

C.42 Refer to daily fridge temperature monitoring record below. **(C.42: 1 mark)**

Day of the week	Monday	Tuesday	Wednesday	Thursday	Friday
Daily Fridge temperature.	4.6	3.8	3.1	9.3	5.1

a. Calculate the mean recorded temperature for the week. (*Show calculations)*

a. _____

_____

_____

_____

C.43 Convert the following: **(C.43: 1.5 marks)**

a) 4.5 mL to _____ µL

b) 1.125kg to _____ g

c) 1500 µmol to _____ mmol

C.44 Calculate how many grams of sodium chloride (NaCl) are required to make 1.0L of a 2 Molar solution?
(Show calculations) **(C.44: 1 mark)**
Atomic Weight of sodium (Na) = 23
Atomic Weight of chlorine (Cl) = 35.5

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END OF SECTION

SECTION E

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

Section E – Question 45 to Question 64 = Total Marks: 40

Short Answer Questions

C.45 List the activities that registered laboratory staff must do to comply with the HPCA act?
(C.45: 1 mark)

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C.46 Outline cultural competency as it relates to medical laboratory science? **(C.46: 2 marks)**

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C.47 Outline Total Quality Management in the medical laboratory setting **(C.47: 2 marks)**

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C.48 Describe the procedures taken when dealing with a blood spill in the laboratory or phlebotomy clinic? **(C.48: 2 marks)**

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C.49 Define Occupational Overuse Syndrome in a medical laboratory workplace. Name a common cause and who should you speak to if you suffer from it? **(C.49: 1.5 marks)**

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C.50 On removing a reagent or product from a laboratory fridge, it is found to be a room temperature. What is the correct process to follow? **(C.50: 1.5 marks)**

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D.51 A request for the tests shown below has been received. List the preferred tubes required, and the correct order of draw.

If more than one specimen type is available **only one** is required:

(0.5 marks for each correct tube)
(0.5marks for correct order of each)
(D.51: 4 marks)

Polycose glucose test, C-Reactive Protein, Activated Partial Thromboplastin Time, Blood Group and Screen.

_____

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_____

D.52 List two major tests used in the investigation and treatment of each of these conditions:

(0.5 marks each)
(D.52: 4 marks)

a. Diabetes

_____

_____

_____

b. Viral infection

_____

_____

_____

c. Anaemia

_____

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_____

d. Blood cancers

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_____

D.53 Outline the principle of the Thrombin Clotting Time test. **(D.53: 1 mark)**

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_____

D.54 a. Name the preferred sample, collection media and testing methodology for SARS-CoV-2 testing in the laboratory. **(D.54a: 1.5 marks)**

_____

_____

_____

b. List 2 alternative sample types suitable for this testing methodology. **(D.54b: 1 mark)**

_____

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D.55 List six of the NZBS requirements for equipment used to store **blood for transfusion**. **(D.55: 3 marks)**

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D.56 Differentiate between serum and plasma. **(D.56: 1 mark)**

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D.57 Name **two** tests that may be performed on plasma from a sodium citrate tube. **(D.57: 1 mark)**

D.58 What is haemopoiesis? List two sites where it occurs. **(D.58: 2 marks)**

D.59 Distinguish between venous, capillary, arterial and cord blood specimens.

(0.5 marks each)

(D.59: 2 marks)

D.60 Outline the storage conditions for platelet concentrates. **(D.60: 1 mark)**

D.61 What additive can be used to reduce the lysis of cells in urine for cytological examination?

(D.61: 0.5 marks)

D.62 List four test panels frequently ordered to help to diagnose the cause of abdominal pain?

(0.5 marks per test)

(D.62: 2 marks)

D.63 a. Describe a method for preparing blood film. **(D.63a: 4 marks)**

b. List two reasons a prepared blood film may be deemed unsuitable. **(D.63b: 1 mark)**

D.64 Expand the abbreviation “MCH” and state the equation for calculating it. **(D.64: 1 mark)**

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END OF SECTION

ESSAY

Section F – Question 65 to Question 66 = Total Marks: 20

Essay Questions

D.65 In essay format, describe the correct collection, transport, storage and processing of urine for routine culture. In the answer, include common pathogens, and the impact of mishandling on the results. **(D.66: 10 marks)**

D.66 In essay format, describe the method in your laboratory for dealing with mis-labelled and unlabelled forms and specimens, for histology testing.

(D.67: 10 marks)

EXTRA PAPER