EXAMINATION FOR QUALIFIED MEDICAL LABORATORY TECHNICIAN

Candidate Name:

Candidate Number:

Subject: **SPECIMEN SERVICES**

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 31-38 = Total Marks 10	*5 Marks*	*5 Marks*
Section C, questions 39-42 = Total Marks 10	*4 Marks*	*6 Marks*
Section D, questions 43-46 = Total Marks 05	*5 Marks*	*0*
Section E, questions 47-68 = Total Marks 40	*10 Marks*	*30 Marks*
Section F, questions 69-70 = 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.

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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 Select a process that does NOT cause haemolysis.

a. Using a needle that is too small
b. Shaking/Mixing the tube too hard
c. Prolonged use of a tourniquet
d. Slow centrifugation

D.14 Select a test that may require the fasting status.

a. Glucose
b. Thyroid function
c. Haemoglobin
d. Troponin

D.15 Select a test that requires to be transported on ice.

a. Renin
b. Full blood count
c. Ammonia
d. Troponin

D.16 Select a suitable specimen type for the Xanthochromia test.

a. CSF
b. Blood
c. Urine
d. Faeces

D.17 Select a blood test that must be protected from light.

a. Potassium
b. Pyruvate
c. Porphyrin
d. Phenytoin

D.18 Choose the specimen of choice for yersinia testing

a. Blood
b. CSF
c. Faeces
d. Urine

D.19 What is the minimum time a SST tube should be left before centrifuging?

a. Not required
b. 10 minutes
c. 30 minutes
d. 60 minutes

D.20 Select a test which is NOT used for the analysis of bone marrow.

a. Cell markers
b. Kleihauer
c. Fluorescent In-Situ Hybridisation (FISH)
d. Chromosome studies

D.21 Select a test that must be transported at 37°C.

a. Tryptase
b. Methotrexate
c. C-Peptide
d. Cryoglobulin

D.22 Which of the following is an immunosuppressive drug?

a. Tacrolimus
b. Digoxin
c. Gentamicin
d. Carbamazepine

D.23 Select the sample type used for the investigation of ringworm.

a. Faeces
b. Bronchial washing
c. Skin scraping
d. Blood

D.24 Which of the following can be used to test for SARS-CoV-2?

a. Urine
b. Biopsy
c. Saliva
d. Rectal swab

D.25 What is the specimen type for foetal fibronectin?

a. Swab
b. Blood
c. Biopsy
d. Faeces

D.26 Select the anticoagulant recommended for blood gas analysis.

a. EDTA
b. Heparin
c. Citrate
d. Fluoride

D.27 Select the standard used for medical laboratory accreditation.

a. ISO15189
b. ISO15198
c. ISO17025
d. ISO18159

D.28 What is the alternative name for urate?

a. Urea
b. Uric acid
c. Uridine
d. Uracil

D.29 Select the specimen used in screening for malaria.

a. Swab
b. Joint aspirate
c. Blood
d. CSF

D.30 Select the full name of the CPD tube.

a. Carbon Pyruvate Disaccharide
b. Cefpodoxime Protein Diphosphate
c. Calcium Phosphate Dimer
d. Citrate Phosphate Dextrose

END OF SECTION

SECTION B

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

Section B – Question 31 to Question 38 = Total Marks: 10

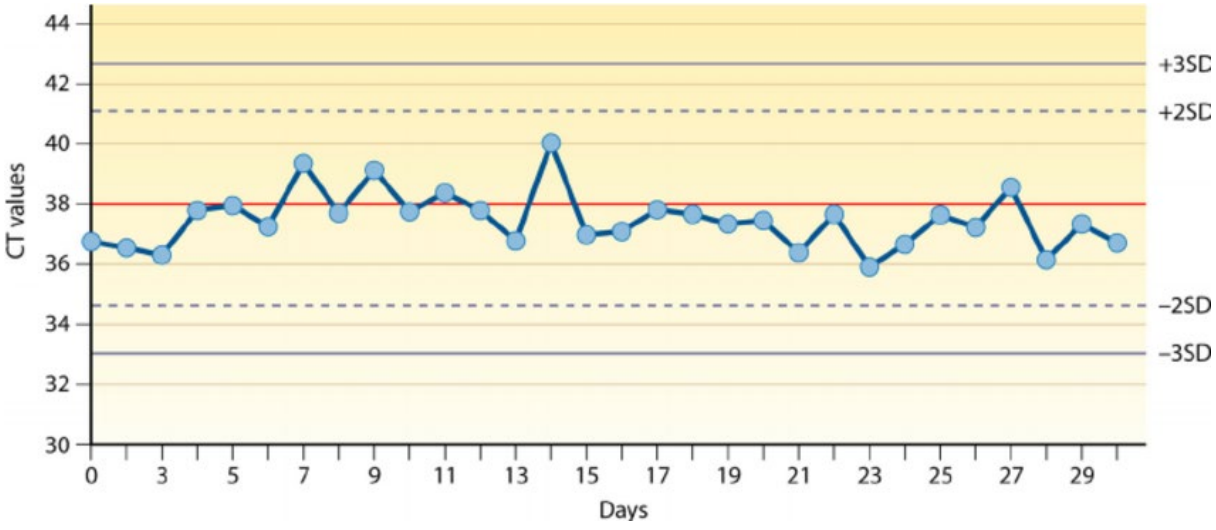
(Answer all questions)

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)

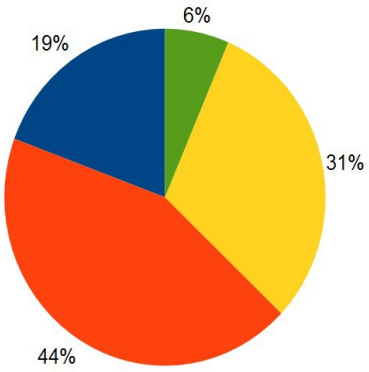


Type of graph: _____

Name the axis: CT values = _____ axis

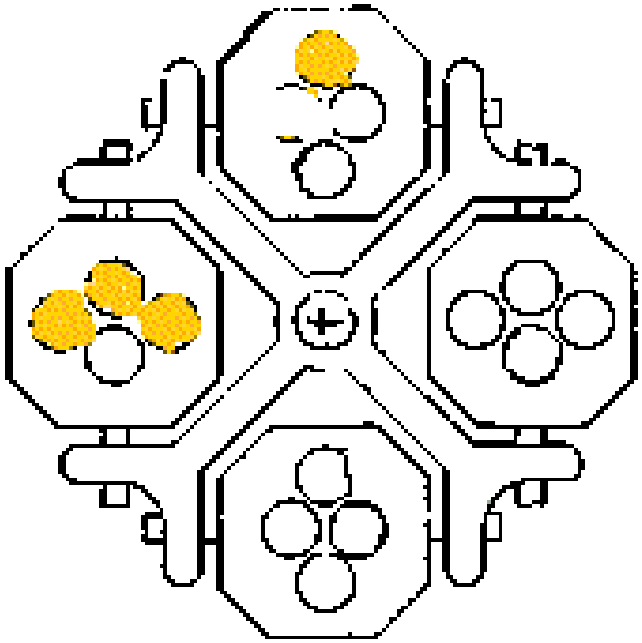
Days = _____ axis

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



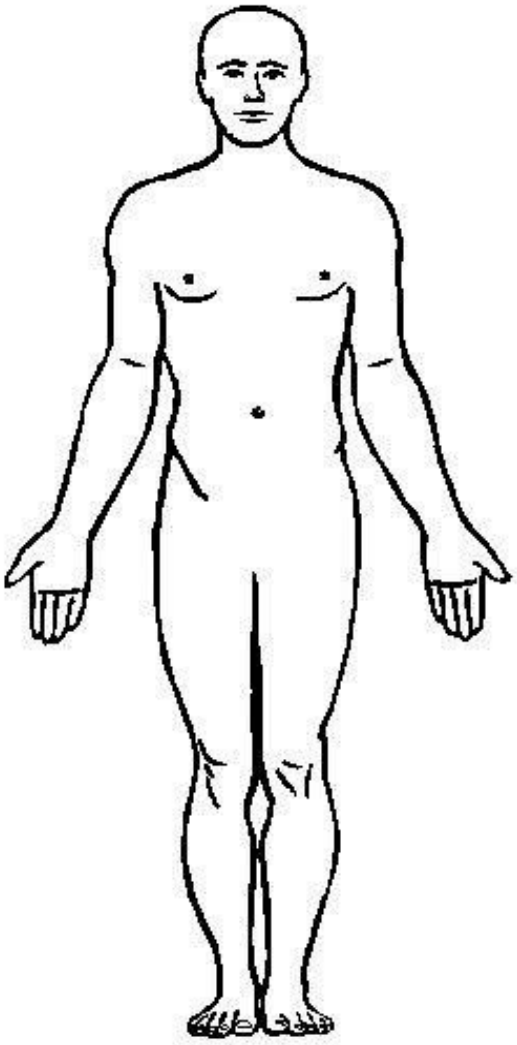
C.34 The yellow dots represent blood tubes in a swing out centrifuge rotor, assume all tubes are filled to the same level.

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 Name the blood collection tubes pictured below. *(0.5 marks per correct answer)*
(D.36: 2 marks)

a. _____

b._____

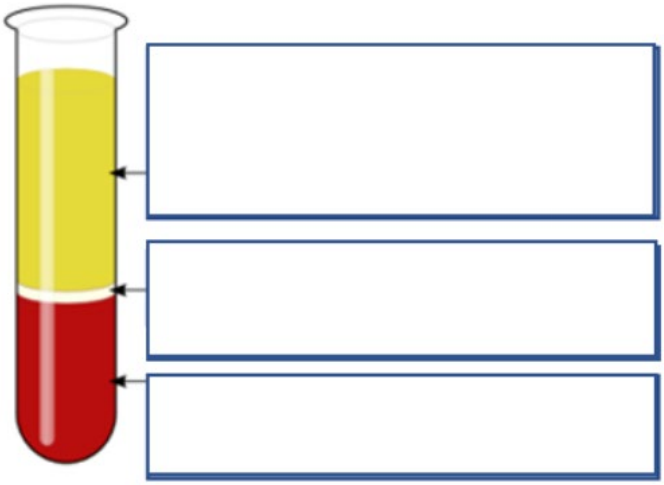
c._____

d._____

D.37 This is a centrifuged EDTA tube. Label each blood component layer.

(0.5 marks per correct answer)

(D.37: 1.5 marks)



D.38 Name the following laboratory equipment. *(0.5 marks per correct answer)*

(D.38: 1.5 marks)

i 

ii 

iii 

i._____ ii. _____ iii. _____

END OF SECTION

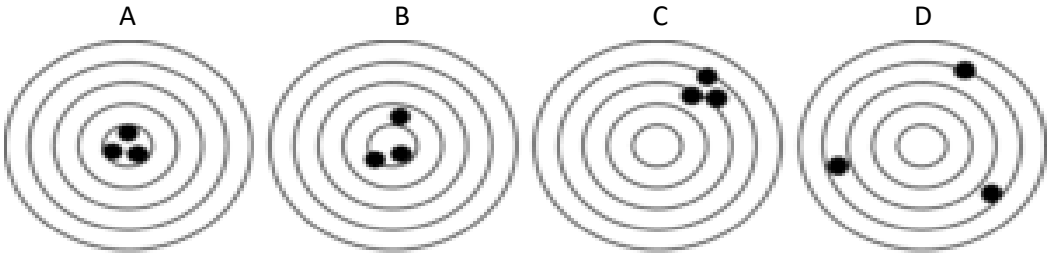
SECTION C

Tables, match column definition

Section C – Question 39 to Question 42 = Total Marks: 10

(Answer all questions)

C.39 Select the correct letter for each description: **(C.39: 2 marks)**



Description Letter

Low Accuracy / High Precision = _____

High Accuracy / Low Precision = _____

Low Accuracy / Low Precision = _____

High Accuracy / High Precision = _____

C.40 Match Column A to Column B, and write your answers in the table below:
(Roman Numerals only required): **(C.40: 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 numeral only required)
Medical Sciences Council	
International Accreditation New Zealand	
New Zealand Institute of Medical Laboratory Science	
Health and disability commission	

D.41 Match Column A to Column B, and write your answers in the table below:
(Roman Numerals only required): (*0.5 marks per correct answer*)
(D.41: 3 marks)

A	B
a. MSU	i. EDTA tube
b. Group B strep screen	ii. Urine
c. Gout in joint	iii. Low Vaginal and Perianal swabs
d. Blood film	iv. Skin scraping
e. Fungal infection	v. Plain/SST tubes
f. Hepatitis B immunity	vi. Aspirate fluid

A	B **(Roman numeral only required)**
a. MSU	
b. Group B strep screen	
g. Gout in joint	
h. Blood film	
i. Fungal infection	
j. Hepatitis B immunity	

D.42 Match Column A to Column B, and write your answers in the table below:
(Roman Numerals only required): *(0.5 marks per correct answer*)

(D.42: 3 marks)

A	B
a. Parathyroid gland	i. Erythropoietin
b. Anterior pituitary	ii. Oestrogen
c. Kidney	Iii. Gastrin
d. Stomach and duodenum	iv. Growth Hormone
e. Ovary	v. Parathyroid hormone
f. Adrenal cortex	vi. Parathyroid Hormone

A	B **(Roman numeral only required)**
a. Parathyroid gland	
b. Anterior pituitary	
c. Kidney	
d. Stomach and duodenum	
e. Ovary	
f. Adrenal cortex	

END OF SECTION

SECTION D

Calculations

Section D – Question 43 to Question 46 = Total Marks: 5

Calculations

C.43 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.43: 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.44 Refer to daily fridge temperature monitoring record below. **(C.44: 1 mark)**

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

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

_____

_____

_____

_____

C.45 Convert the following: **(C.45: 1.5 marks)**

a) 4.5 mL to _____ µL

b) 1.125kg to _____ g

c) 1500 µmol to _____ mmol

C.46 Calculate how many grams of sodium chloride (NaCl) are required to make 1.0L of a 2 Molar solution? *(Show calculations)* **(C.46: 1 mark)**

Atomic Weight of sodium (Na) = 23
Atomic Weight of chlorine (Cl) = 35.5

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

END OF SECTION

SECTION E

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

Section E – Question 47 to Question 68 = Total Marks: 40

Short Answer Questions

C.47 List the activities that registered laboratory staff must do to comply with the HPCA act? **(C.47: 1 mark)**

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_____

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C.48 Outline cultural competency as it relates to medical laboratory science? **(C.48: 2 marks)**

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C.49 Outline Total Quality Management in the medical laboratory setting **(C.49: 2 marks)**

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C.50 Describe the procedures taken when dealing with a blood spill in the laboratory or phlebotomy clinic? **(C.50: 2 marks)**

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C.51 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.51: 1.5 marks)**

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C.52 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.52: 1.5 marks)**

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_____

D.53 Outline why some blood tests require specimens to be protected from light during transportation. Name **TWO** (2) tests that require the specimen to be protected from the light.

(D.53: 1.5 marks)

D.54 Define Delta-Check. **(D.54: 1 mark)**

D.55 Outline what a data logger is and give an example of its use in the laboratory.

(D.55: 1.5 marks)

D.56 Indicate **FOUR** (4) examples of specimen rejection criteria. **(D.56: 2 marks)**

D.57 Indicate the purpose of the gel in the vacutainer tube? **(D.57: 1 mark)**

_____

_____

_____

_____

D.58 List **TWO** (2) tests that are used to check for diabetes. **(D.58: 1 mark)**

_____

_____

_____

D.59 a. Indicate what the Quantiferon Gold test is used to diagnose **(D.59: 4.5 marks)**
(0.5 marks)

a. _____

b. List an alternative test that can also be used for this diagnosis. *(0.5 marks)*

b. _____

c. For the Quantiferon Gold test:

- indicate the samples required,
- the specific conditions that must be adhered to during all stages of the collection process,
- any sample preparation for delayed transportation prior to the samples being forwarded to the correct department for analysis. *(3 marks)*

c. _____

_____

_____

_____

_____

_____

_____

_____

d. State the name that the Quantiferon Gold test is also known as. *(0.5 marks)*

d. _____

_____

D.60 Differentiate between serum and plasma, and give TWO (2) examples of tube types for both serum and plasma. **(D.60: 3 marks)**

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D.61 a. Expand the abbreviation RPM. **(D.61: 3 marks)**
(0.5 marks)

a. _____

_____

b. Expand the abbreviation RCF. *(0.5 marks)*

b. _____

_____

c. Distinguish between g force and RPM. *(1 mark)*

c. _____

_____

_____

_____

d. State why g force is the preferred unit to RPM. *(1mark)*

d. _____

_____

_____

_____

_____

D.62 Define Haemolysis and Lipaemia: **(D.62: 1 mark)**

_____

_____

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_____

D.63 Expand the acronyms below: *(0.5 marks per correct answer*)
(D.63: 2 marks)

a. TAT _____

b. TDM _____

c. PCR _____

d. CSF _____

D.64 Explain what the pneumatic tube system is, and how it operates in a hospital setting.
(D.64: 1 mark)

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D.65 List <u>four</u> Liver function tests and name an acceptable tube type. **(D.65: 2.5 marks)**

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D.66 Indicate what the sweat test measures, and what condition can be identified? **(D.66: 1 mark)**

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D.67 Outline when a seminal fluid sample must be processed urgently and how it should be handled in Specimen Services **(D.67: 1 mark)**

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D.68 a. Outline what a reference range is. **(D.68: 3 marks)**
(1 mark)

a. _____

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_____

b. List 4 factors that can affect the lab results *(2 marks)*

b. _____

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END OF SECTION

ESSAY

Section F – Question 69 to Question 70 = Total Marks: 20

Essay Questions

D.69 In essay format, describe what Blood Body Fluid Exposure (BBFE) is, and describe the correct procedures for all stages of this event. **(D.69: 10 marks)**

D.70 In essay format, discuss all the pre-analytical steps required for the collection and transportation of a urine sample, for the analysis of a suspected urinary tract infection.

(D.70: 10 marks)

EXTRA PAPER