EXAMINATION FOR QUALIFIED MEDICAL LABORATORY TECHNICIAN

Candidate Name:

Candidate Number:

Subject: **PHLEBOTOMY**

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 31-36 = Total Marks 10	*5 Marks*	*5 Marks*
Section C, questions 37-40 = Total Marks 10	*4 Marks*	*6 Marks*
Section D, questions 41-44 = Total Marks 5	*5 Marks*	*0*
Section E, questions 45-60 = Total Marks 40	*10 Marks*	*30 Marks*
Section F, questions 61-62 = 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.

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 The temperature of a fresh urine sample collected for drug testing must be checked as part of the “chain of custody” process. The temperature should be between:

a. 20 and 25 degrees Celsius.

b. 25 and 28 degrees Celsius.

c. 28 and 32 degrees Celsius.

d. 32 and 38 degrees Celsius.

D.14 Cryoglobulins are abnormal serum proteins that:

a. Attach to fat globules.

b. Break down fibrinogen.

c. Precipitate when cooled.

d. Agglutinate when warmed.

D.15 Tubes used for the Quantiferon TB Gold test are labelled as:

a. Fluoride, Heparin, Plain, EDTA

b. Nil, TB1 Antigen, TB2 Antigen, Mitogen

c. Fluoride, Heparin, Clot Activator, EDTA

d. Nil, Antigen, TB Antigen, Mitogen

D.16 Which of the following are the chambers of the heart that receive blood from other parts of the body?

a. Right atrium and right ventricle

b. Left atrium and left ventricle.

c. Right ventricle and left ventricle.

d. Right atrium and left atrium.

D.17 What is the procedure for needle-stick injury?

a. Bleed site, cover site, dispose of needle, report it.

b. Report it, bleed site, cover site, dispose of needle.

c. Dispose of needle, bleed site, cover site, report it.

d. Cover site, report it, bleed site, dispose of needle.

D.18 The Dexamethasone Suppression Test is performed to measure:

a. Thyroid levels in the thyroid glands.

b. Cortisol levels in adreno-cortical hyperfunction.

c. Hormone levels in the adrenal glands.

d. Cortisol levels in adreno-cortical hypofunction.

D.19 “Trough” drug levels on a patient indicate that:

a. Levels of the drug stay within the therapeutic range.

b. Drug levels have reached the highest concentrations.

c. The desired drug effect has been established for the patient.

d. Testing confirms the patient is taking the drug.

D.20 Which of the following is another name for a platelet?

a. Leukocyte

b. Thrombocyte

c. Monocyte

d. Lymphocyte

D.21 Which of the following specimens can be collected quickly and easily in a non-invasive manner to monitor hormone levels?

a. Semen

b. Saliva

c. Sputum

d. Sweat

D.22 Scarred or burned areas should be avoided as blood collection sites because:

a. Analytes are diluted in such area.

b. Circulation is possibly impaired.

c. Veins are most likely thrombosed.

d. Specimens tend to be haemolysed.

D.23 When drawing a blood alcohol specimen, it is acceptable to clean the site with

a. benzalkonium chloride

b. isopropyl alcohol

c. methanol prep

d. tincture of iodine

D.24 A patient presents to the blood collection centre for a routine blood collection. The patient informs the phlebotomist that she has diabetes and had a mastectomy on the right side six months ago. Based on this information, the phlebotomist should do the blood draw from:

a. Left arm

b. Right arm

c. Left foot

d. Right foot

D.25 Which of the following is the least hazardous area of an infant's foot for capillary procedure?

a. Central area of the heel

b. Lateral plantar heel surface

c. Medial area of the arch

d. Posterior curvature of the heel

D.26 An uncorrected imbalance of this analyte in a patient can quickly lead to death from cardiac arrest.

a. Sodium

b. Haemoglobin

c. Potassium

d. Prothrombin

D.27 Prolonged tourniquet application can affect blood composition because it causes:

a. Delayed homeostasis

b. Dilution of plasma

c. Specimen haemolysis

d. Haemoconcentration

D.28 A lipaemic specimen is a clue that the patient was probably:

a. In basal state

b. Jaundiced

c. Dehydrated

d. Not fasting

D.29 When performing capillary blood collections which order of draw is to be adhered to?

a. Blood gases, serum, heparin, EDTA.

b. EDTA, serum, heparin, blood gases.

c. Serum, heparin, EDTA, blood gases.

d. Blood gases, EDTA, heparin, serum.

D.30 Skin prick testing is used to determine whether a patient has detectable _____ to a specific allergen.

a. IgA antibodies

b. IgE antibodies

c. IgG antibodies

d. IgM antibodies

END OF SECTION

SECTION B

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

Section B – Question 31 to Question 36 = Total Marks: 10

(Answer all questions)

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

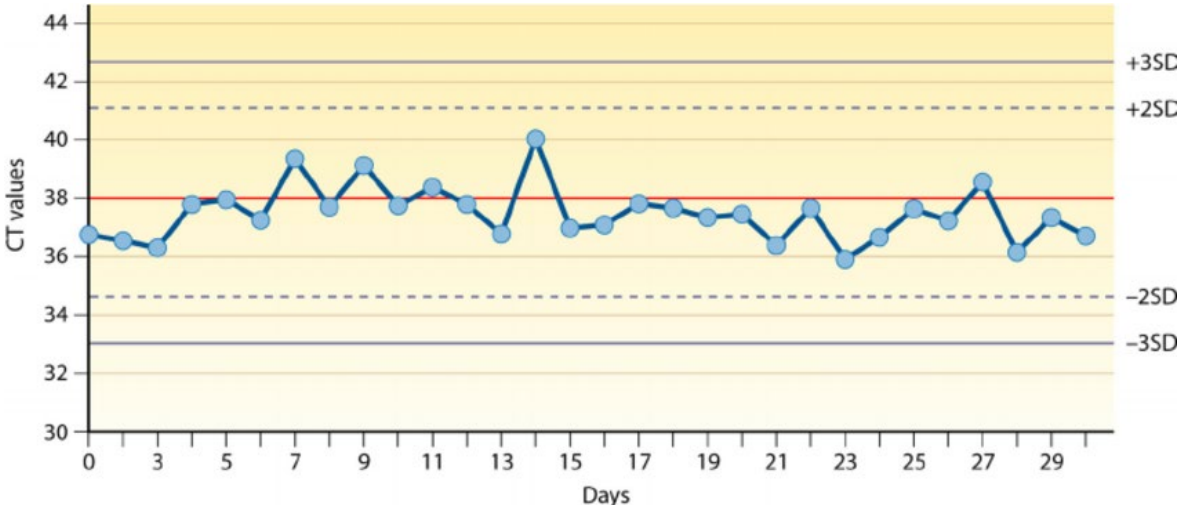
(C.31: 1 mark)

a.		b.	

a. _____ b. _____

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

(C.32: 1.5 marks)

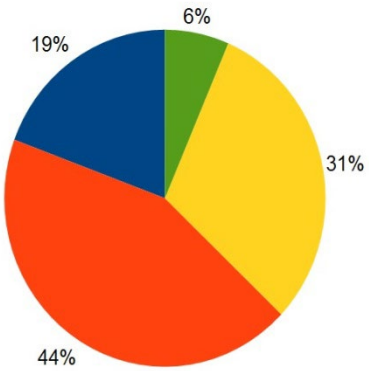


Type of graph: _____

Name the axis: CT values = _____ axis

Days = _____ axis

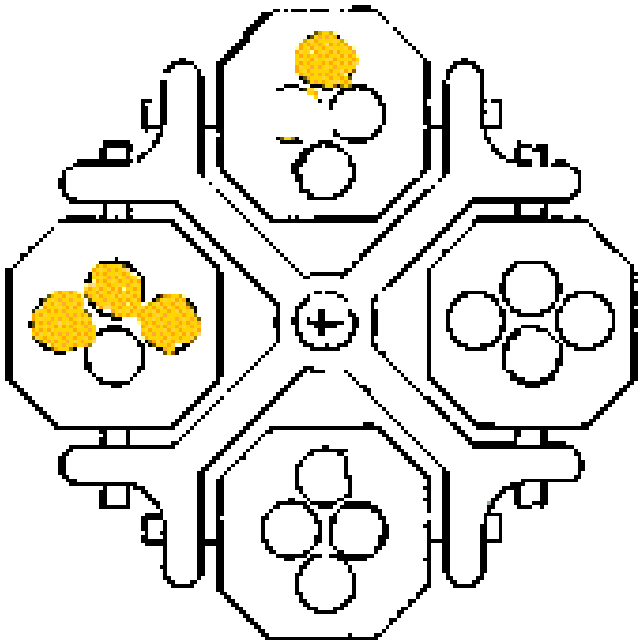
C.33 Name the type of graph **(C.33: 0.5 marks)**



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

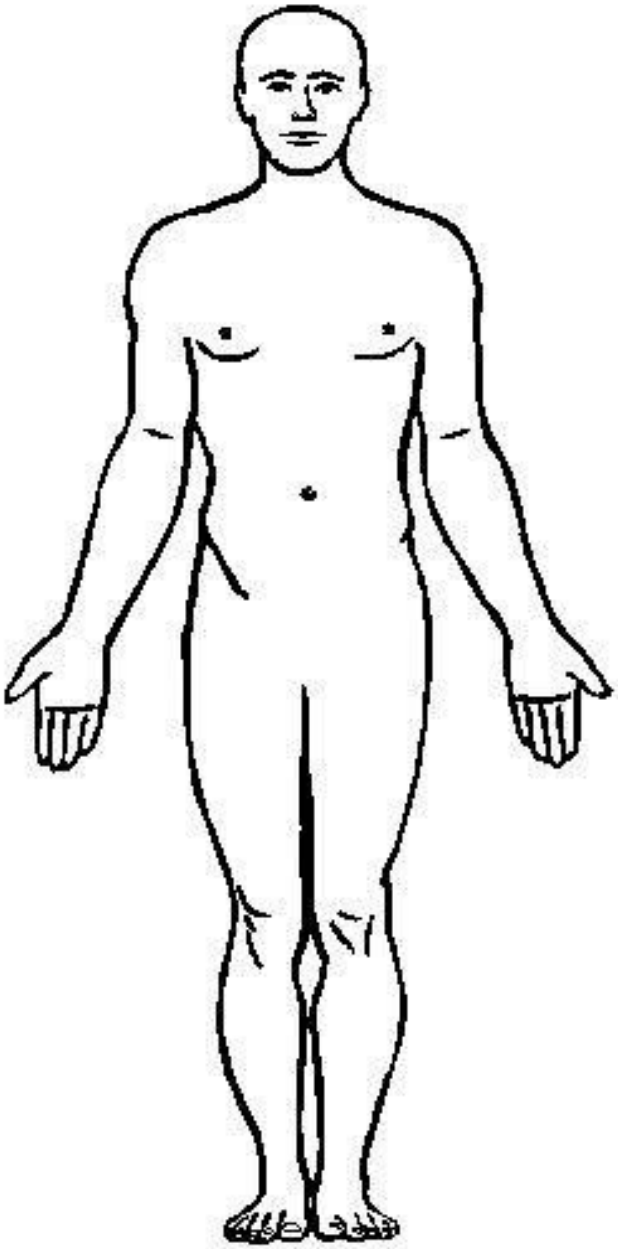
You have 4 more tubes to centrifuge, indicate on the rotor where they need to be positioned.

(C.34: 0.5 marks)



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

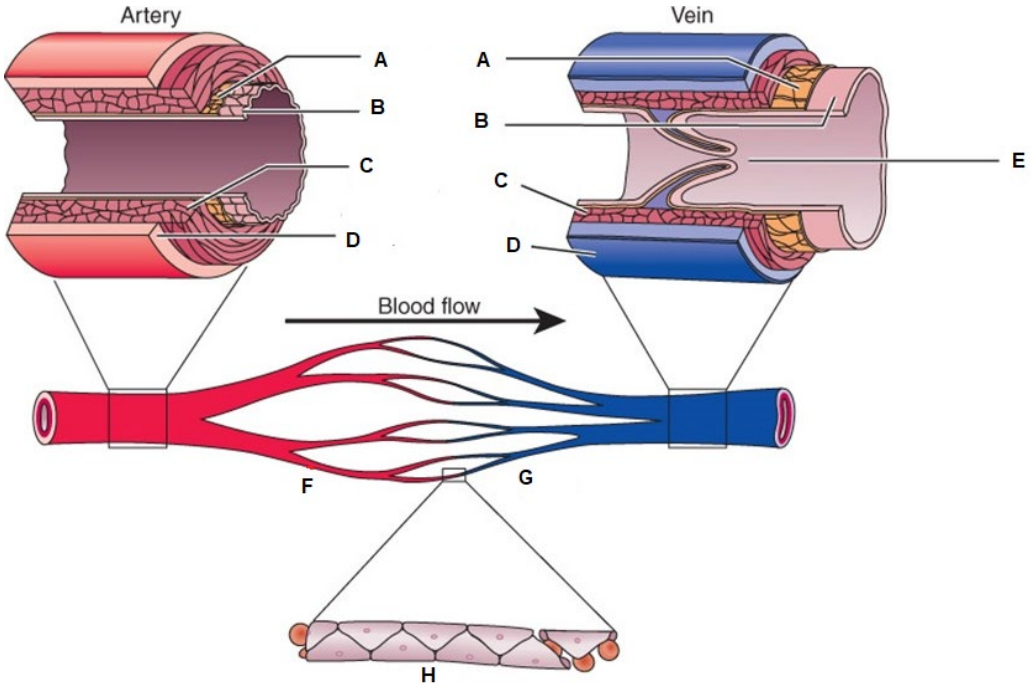
a. Femoral artery
b. Jugular vein
c. Median cubital vein



D.36 a. Label the diagrams below using the word list provided. Write your answers (corresponding letter) next to the word. (*0.5 marks per correct answer*)

(D.36: 5 marks)

Word List	Corresponding letter:
Capillary	
Venule	
Arteriole	
Elastic tissue	
Tunica media	
Tunica adventitia	
Valve	
Tunica intima	



b. Indicate in which blood vessel:

i. A phlebotomist can feel a pulse. *(0.5 marks)*

_____

ii. The exchange of oxygen for carbon dioxide and of nutrients for waste to take place between the cells and the blood. *(0.5 marks)*

_____

END OF SECTION

SECTION C

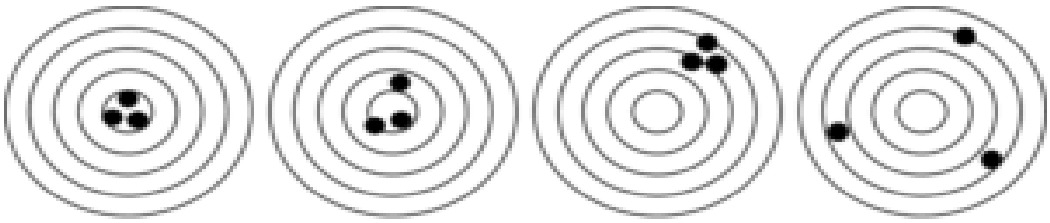
Tables, match column definition

Section C – Question 37 to Question 40 = Total Marks: 10

(Answer all questions)

C.37 Select the correct letter for each description: **(C.37: 2 marks)**

A B C D



Description Letter

Low Accuracy / High Precision = _____

High Accuracy / Low Precision = _____

Low Accuracy / Low Precision = _____

High Accuracy / High Precision = _____

C.38 Match Column A to Column B and write your answers in the table below.
(Roman numerals only required.) **(C.38: 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.39 Match Column A (Activity Example) to Column B (Means of Transmission) and write your answers in the table below. (Roman Numerals only required): **(D.39: 3 marks)**

Activity Example (A)	**Means of Transmission (B)**
Collecting a throat culture specimen from a coughing patient without wearing a mask.	i. Airborne
Entering a TB patient's room without an N95 respirator.	ii. Direct contact
Filling a TB syringe with antigen without first cleaning the top of the antigen vial.	iii. Indirect contact
Handling a dead rodent.	iv. Droplet
Kissing someone with mononucleosis.	v. Vector
Rubbing your eye after touching a contaminated blood tube.	vi. Vehicle

Activity Example (A)	**Means of Transmission (B) (Roman numerals only required)**
Collecting a throat culture specimen from a coughing patient without wearing a mask.	
Entering a TB patient's room without an N95 respirator.	
Filling a TB syringe with antigen without first cleaning the top of the antigen vial.	
Handling a dead rodent.	
Kissing someone with mononucleosis.	
Rubbing your eye after touching a contaminated blood tube.	

D.40 Match Column A (Non-blood Test) with Column B (Type of Specimen) and Column C (Specimen Requirement) your answers in the table below. (Roman Numerals only required):

(D.40: 3 marks)

Non-blood Test	Type of Specimen	Specimen Requirement
i. Cytology	Urine	First catch
ii. Bordetella Pertussis	Random faeces	On ice
iii. Creatinine clearance	Nasopharyngeal swab	Send to the laboratory ASAP.
iv. Chlamydia	Semen	Send to the laboratory on body temperature.
v. Male fertility studies	Sputum	Deliver fresh each day for three consecutive mornings.
vi. Pancreatic elastase	24-hour urine, plain bottle	Need blood sample collection within 24 hours.

Non-blood Test (Roman numerals only required)	Type of Specimen	Specimen Requirement
	Urine	First catch
	Random faeces	On ice
	Nasopharyngeal swab	Send to the laboratory ASAP.
	Semen	Send to the laboratory on body temperature.
	Sputum	Deliver fresh each day for three consecutive mornings.
	24-hour urine, plain bottle	Need blood sample collection within 24 hours.

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)*

_____

_____

_____

_____

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 60 = 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. Define nosocomial infection: **(D.51: 2 marks)**
(0.5 mark)

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b. List **THREE (3)** examples of nosocomial infections. *(0.5 marks per correct answer*)

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D.52 a. State **TWO (2)** purposes of the Newborn Metabolic Screening. **(D.52: 3 marks)**
(2 marks)

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b. Name **TWO (2)** examples of Newborn Metabolic diseases. *(0.5 mark per correct answer)*

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D.53 Outline the instructions given for the collection of urine for tuberculosis culture.
(D.53: 2.5 marks)

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D.54 Identify **FOUR (4)** situations that require a phlebotomist to hand wash with soap and water rather than an alcohol-based hand gel. **(D.54: 2 marks)**

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D.55 Describe the New Zealand Blood Service specimen labelling requirements for a patient's specimen taken for Group & Antibody Screen. **(D.55: 2.5 marks)**

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D.56 a. Define Haemostasis. **(D.56: 3 marks)**
(1 mark)

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b. List the **FOUR (4)** phases of the haemostatic process and state the primary process taking place in each phase.

(0.5 marks per correct answer)

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D.57 Define the following terms: **(D.57: 2 marks)**

a. Vasovagal Syncope *(1 mark)*

_____

_____

b. Anaphylaxis *(1 mark)*

_____

_____

D.58 a. Name **FOUR (4)** commonly used anticoagulated blood collection tubes. **(D.58: 6 marks)** *(2 marks)*

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b. Describe the mode of action of each of the **FOUR (4)** additives. *(4 marks)*

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D.59 Outline **FOUR (4)** differences that differentiate Antiseptics and Disinfectants. **(D.59: 4 marks)**

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D.60 List **SIX (6)** procedural errors during venepuncture that can lead to haemolysis of blood specimens.

(D.60: 3 Marks)

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END OF SECTION

ESSAY

Section F – Question 61 to Question 62 = Total Marks: 20

Essay Questions

D.61 In essay format describe why the basilic vein should be avoided as a choice for venepuncture and the adverse events that might occur from errant attempts to puncture this vein. Include in your essay the actions the phlebotomists should take if such adverse events occurred.

(D.61: 10 marks)

D.62 In essay format describe the blood collection process from a COVID suspected patient, from preparation through to post collection protocols. **(D.62: 10 marks)**

EXTRA PAPER