# EXAMINATION FOR QUALIFIED MEDICAL LABORATORY TECHNICIAN

**Candidate Name:**

**Candidate Number:**

**Subject:** **DONOR**

**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 37-39 = Total Marks 10 | *4 Marks* | *6 Marks* |
| Section D, questions 40-43 = Total Marks 05 | *5 Marks* | *0* |
| Section E, questions 44-64 = 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 does the term Lapsed Donor mean?

a. Someone who has never donated before
b. Someone who has not donated in the last three months
c. Someone who has not donated in the previous year
d. Someone who has not donated in the previous two years

D.14 The left ventricle of the heart pumps blood into the:

a. Carotid artery

b. Pulmonary artery

c. Aorta

d. Pulmonary vein

D.15 The gallbladder is best described as:

a. A place to store and concentrate bile

b. Responsible for the peristaltic movement of food down to the stomach

c. The part of the intestine where digestion and absorption of food takes place

d. A filter for blood coming from the digestive tract before it passes to the rest of the body

D.16 Regular donors are accepted to donate up to which birthday?

a. Up to their 71st birthday

b. Up to their 72nd birthday

c. Up to their 81st birthday

d. Up to their 82nd birthday

D.17 Which of the following definitions describes the meaning of 'deferral' in the NZBS context:

a. A donor who has not donated in the last two years

b. An investigation into a donor's eligibility to donate

c. The suspension of the eligibility of an individual to donate

d. The retirement of a donor

D.18 From which tube is a Full Blood Count (FBC) taken?

a. EADT

b. EDTA

c. EDMT

d. EATD

D.19 A first-time female donor weighing 78g and measuring 185cm tall has presented to donate plasma. Identify the plasma weight that can be collected from this donor.

**FEMALE-1**

| Weight (kg) \ Height (cm) | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 |
|---|---|---|---|---|---|---|---|---|---|
| 50 | 500 | 512 | 524 | 535 | 547 | 558 | 570 | 581 | 592 |
| 55 | 520 | 533 | 545 | 557 | 569 | 581 | 593 | 605 | 616 |
| 60 | 540 | 553 | 565 | 578 | 590 | 603 | 615 | 627 | 639 |
| 65 | 558 | 571 | 585 | 598 | 611 | 623 | 636 | 649 | 661 |
| 70 | 576 | 589 | 603 | 617 | 630 | 643 | 656 | 669 | 682 |
| 75 | 593 | 607 | 621 | 635 | 648 | 662 | 676 | 689 | 702 |
| 80 | 593 | 624 | 638 | 652 | 666 | 680 | 694 | 708 | 722 |
| 85 | 593 | 624 | 654 | 669 | 683 | 698 | 712 | 726 | 740 |
| 90 | 593 | 624 | 654 | 685 | 700 | 715 | 729 | 744 | 758 |
| 95 | 593 | 624 | 654 | 701 | 716 | 731 | 746 | 761 | 776 |
| 100 | 602 | 624 | 654 | 701 | 732 | 747 | 763 | 778 | 793 |
| 105 | 615 | 629 | 654 | 701 | 732 | 763 | 778 | 794 | 809 |
| 110+ | 627 | 642 | 656 | 701 | 732 | 763 | 794 | 810 | 825 |

a. 689g

b. 694g

c. 708g

d. 726g

D.20 Which of the following is an example of a biological hazard?

a. Micro-organism

b. Chemical reagent

c. Clothing

d. Saline

D.21 What is the minimum time period a donor must wait after donating plasma before they can donate whole blood?

a. 24 hours

b. 48 hours

c. 14 days

d. 28 days

D.22 Improper needle position is a common cause of failure when obtaining blood. If the bevel of the needle is against the vein wall it may:

a. Cause the blood to flow too fast

b. Impair the flow of blood

c. Cause an air embolus

d. Cause deep vein thrombosis

D.23 Which of the following body parts is **NOT** considered part of the endocrine system?

a. hypothalamus

b. pituitary gland

c. thyroid gland

d. lymph gland

D.24 Which of the following is **NOT** a mode of transmission for Hepatitis B?

a. sexual contact

b. sharing used needles

c. mother to baby during birth

d. sharing food utensils

D.25 What is albumin?

a. A hormone in the pituitary gland

b. A protein in plasma

c. A substance stored in the gallbladder

d. A clotting factor

D.26 Which adverse event is characterised by sudden unexpected loss of heart function, breathing and consciousness?

a. Vasovagal reaction

b. Citrate reaction

c. Cardiac arrest

d. Hypertension

D.27 What does the acronym AED stand for?

a. Automatic Event Detector

b. Automated External Defibrillator

c. Activated Emergency Defibrillator

d. Automatic External Detector

D.28 The urinary system includes which parts of the human body:

a. parathyroid gland, pancreas and adrenal gland

b. vas deferens, seminal vesicles and prostate

c. kidneys, bladder and ureters

d. liver, small intestine and large intestine

D.29 What does the acronym AHF stand for?

a. Anti-hyper immune plasma

b. Anti-hypertensive factor

c. Anti-haemolysis function

d. Anti-haemolytic factor

D.30 What temperature are Ultra Low Temperature freezers maintained at?

a. $0^0$C

b. Below -$20^0$C

c. Below -$40^0$C

d. Below -$60^0$C

**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)*

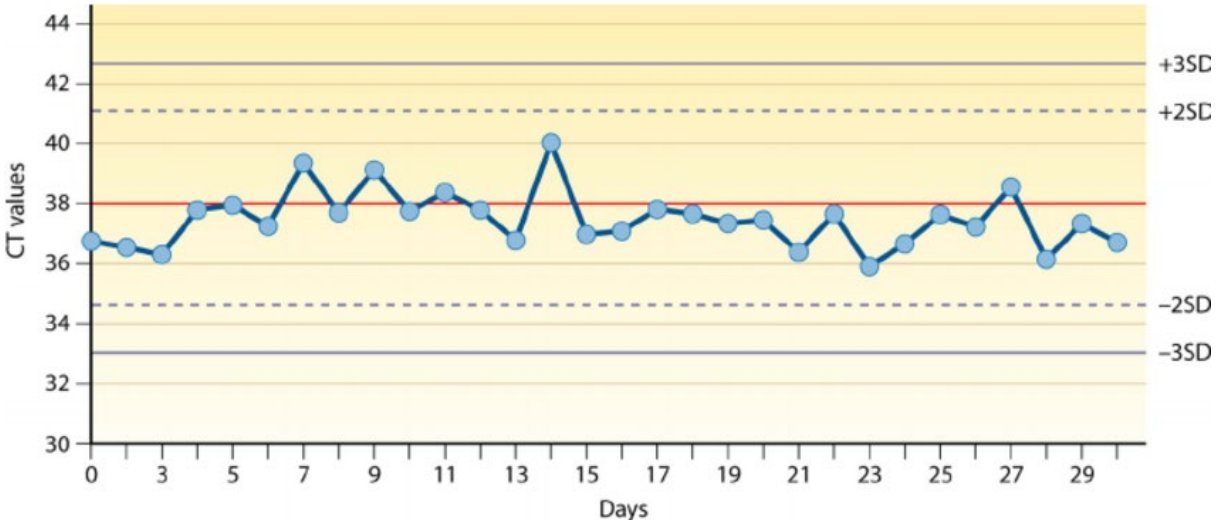
**(C.31: 1 mark)**

| | | | |
|---|---|---|---|
| a. |  | b. |  |

a. _____ b. _____

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

**(C.32: 1.5 marks)**

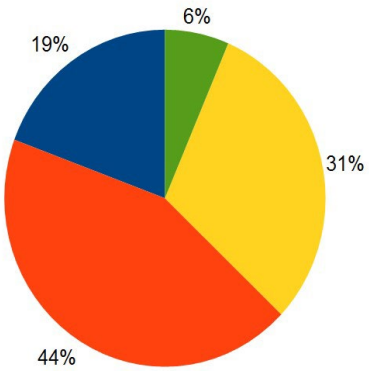



Type of graph: _____

Name the axis: CT values = _____ axis

Days = _____ axis

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

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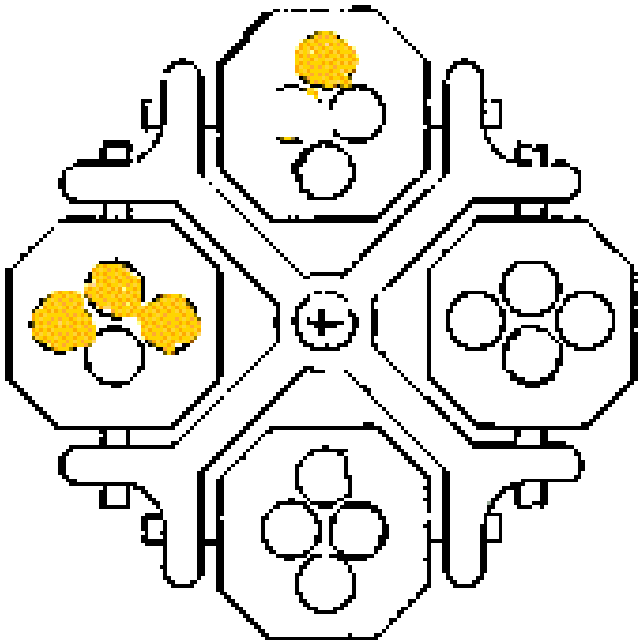
C.34 The yellow dots represent blood tubes in a swing out centrifuge rotor, assume all tubes are filled to the same level.

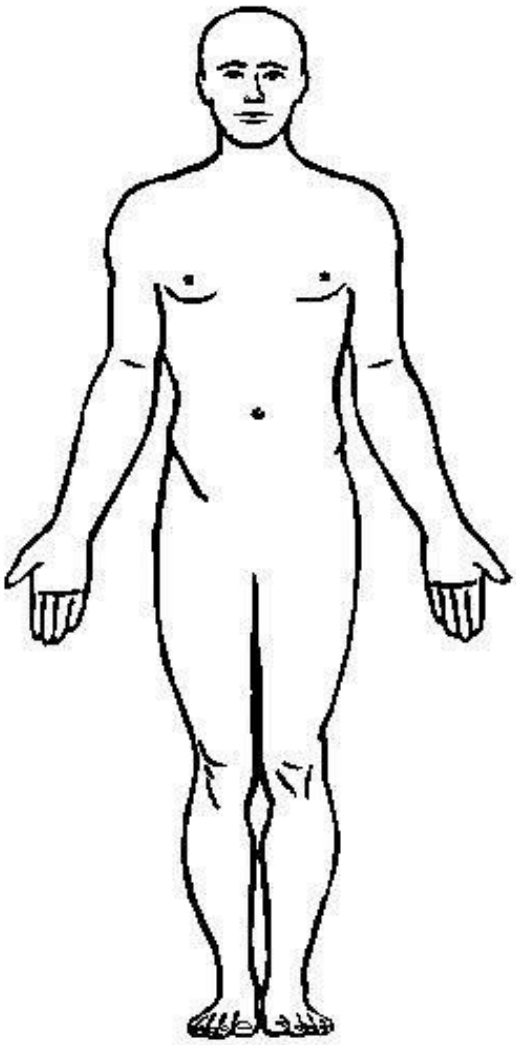
You have 4 more tubes to centrifuge, indicate on the rotor where they need to be positioned.

**(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 Identify the labelled machine parts/ pieces used in the collection of haemoglobin sample from donors at NZBS **(D.36: 5 marks)**



| Labelled machine parts/pieces | Write down your answer below |
|---|---|
| **1.** | |
| **2.** | |
| **3.** | |
| **4.** | |
| **5.** | |
| **6.** | |
| **7.** | |
| **8.** | |
| **9.** | |
| **10.** | |

**END OF SECTION**

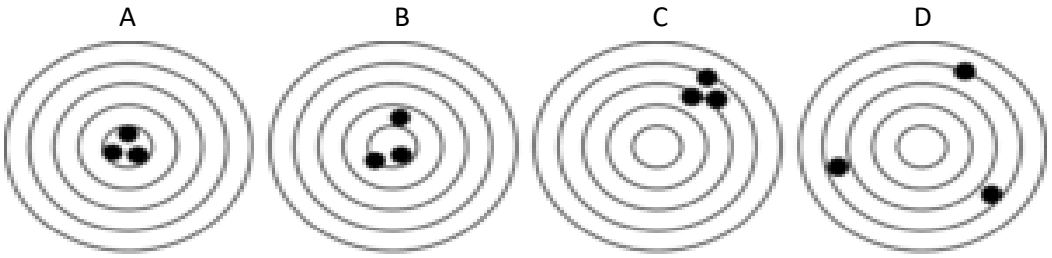
**SECTION C**

*Tables, match column definition*

**Section C – Question 37 to Question 39 = Total Marks: 10**

**(Answer all questions)**

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




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 Complete the chart below, providing a meaning and one example for each of the prefixes/suffixes.
Write your answers in the space provided. **(C.39: 6 marks)**

| Prefix/suffix | Meaning | Example |
|---|---|---|
| Therm(o) | | |
| Varic(o) | | |
| -graph | | |
| Derma- | | |
| Brady- | | |
| Hydro- | | |

**END OF SECTION**

**SECTION D**

*Calculations*

**Section D – Question 40 to Question 43 = Total Marks: 5**

**(Answer all questions)**

C.40 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.40: 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.41 Refer to daily fridge temperature monitoring record below. **(C.41: 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. _____

_____

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_____

C.42 Convert the following: **(C.42: 1.5 marks)**

a) 4.5 mL to _____ µL

b) 1.125kg to _____ g

c) 1500 µmol to _____ mmol

C.43 Calculate how many grams of sodium chloride (NaCl) are required to make 1.0L of a 2 Molar solution?
*(Show calculations)* **(C.43: 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 44 to Question 64 = Total Marks: 40**

**Short Answer Questions**

C.44 List the activities that registered laboratory staff must do to comply with the HPCA act?
**(C.44: 1 mark)**

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C.45 Outline cultural competency as it relates to medical laboratory science? **(C.45: 2 marks)**

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C.46 Outline Total Quality Management in the medical laboratory setting **(C.46: 2 marks)**

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C.47 Describe the procedures taken when dealing with a blood spill in the laboratory or phlebotomy clinic? **(C.47: 2 marks)**

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C.48 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.48: 1.5 marks)**

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C.49 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.49: 1.5 marks)**

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D.50 Outline the steps required to perform Applied Muscle Tension during a donation, and why this is beneficial for the donor **(D.50: 3 marks)**

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D.51 Define the concept of Informed Consent **(D.51: 2.5 marks)**

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D.52 Outline the purpose of the Privacy Act 2020 **(D.52: 1 mark)**

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D.53 Outline the procedure for managing a suspected accidental arterial puncture **(D.53: 4.5 marks)**

D.54 List three (3) organs or structures that make up part of the respiratory system and outline their function. **(D.54: 3 marks)**

D.55 Outline the process for cleaning the MCS+ machine pumps. **(D.55: 2 marks)**

D.56 Indicate why laboratory equipment is required to undergo maintenance and calibration.
**(D.56: 2.5 marks)**

D.57 List and distinguish the function of the 3 main types of blood vessels. **(D.57: 1.5 marks)**

D.58 Donors suitable for apheresis must meet the criteria for whole blood donation as well as several additional criteria. List four of these additional criteria. **(D.58: 2 marks)**

D.59 Distinguish between pathogenicity and virulence **(D.59: 1 mark)**

D.60 List four possible methods of transmission for Zika Virus **(D.60: 2 marks)**

D.61 List the minimum and maximum haemoglobin level for female donors **(D.61: 1 mark)**

D.62 Outline the procedure for cleaning the Vasini portable heat sealer used at NZBS for heat-sealing tubes **(D.62: 1.5 marks)**

D.63 List three (3) items found in the NZBS Spill Kit **(D.63: 1.5 marks)**

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D.64 Identify two (2) criteria for selecting New Zealand Bone Marrow Registry Donor **(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, outline the criteria and process for performing a changeover on a whole blood donor, including the steps required to link both venesection attempts. **(D.65: 10 marks)**

D.66 In essay format, outline Vasovagal Reaction in the context of blood donation, including common signs and symptoms. Identify appropriate management and reporting requirements of vasovagal reactions at New Zealand Blood Service. **(D.66: 10 marks)**

## EXTRA PAPER