EXAMINATION FOR QUALIFIED MEDICAL LABORATORY TECHNICIAN

Subject:	**Microbiology**
Examination Date:	**Saturday 6 November 2021**
Time Allowed:	**3 hours – 9.30am – 12.40pm** **10 minutes extra time for reading the paper**

Candidate Number: «Member_No»
Name: «First_Name» «Surname»

General Instructions	
1.	Total marks for paper = 100.
2.	Marks for each question are as indicated.
3.	The paper consists of common syllabus and discipline specific questions. The relevant breakdown of marks is indicated under each Section Heading.
	To pass the QMLT examination, candidates must gain a minimum of a C grade (50%) in the common syllabus examination component and a minimum of a C grade (50%) in the discipline specific component of the written examination.
4.	All questions to be attempted.
5.	Use of a calculator is permitted.
6.	Write all answers into this examination booklet. Extra pages are provided at the back of this examination paper booklet if you require more space to write answers. Ensure you indicate the answer is continued on an additional page and label these additional pages clearly with your candidate number and the number of the question you are answering.

WORD DEFINITIONS	
Calculate	Perform a mathematical process to get the answer
Classify	Be able to designate to a group
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
Differentiate	Briefly and concisely state the main differences
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
Label	Give a name to
List	Headings only
Match	Find one that closely resembles another
Outline	Write brief notes incorporating the essential facts
Recognise	Be able to identify the main points

SECTION A

Multi Choice Questions - choose one answer for each question

Common Curriculum Questions C.1 - C.12 = 6 marks
Discipline Specific Questions D.13 - D.30 = 9 marks

(0.5 marks per correct answer)
Total Marks = 15 marks

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 Agreeing to something once provided with all the facts is an example of:

a. Confidential information
b. Work place ethics
c. Informed consent
d. Human resource management

C.2 Which organisation is responsible for issuing an Annual Practising Certificate?

a. Medical Sciences Council of New Zealand
b. New Zealand Institute of Medical Laboratory Science
c. New Zealand Ministry of Health
d. New Zealand Qualification Authority

C.3 Harmonisation is:

a. The process leading to the uniformity of test results from different methods
b. Where staff are encouraged to work happily together
c. The process of taking tests out of one laboratory and sending to another to save money
d. The process of review of laboratory procedure to make things run smoothly

C.4 Alveoli are found in which organ?

a. Heart
b. Brain
c. Lung
d. Kidney

C.5 Specimens transported throughout New Zealand must adhere to which industry standard?

a. IANZ guidelines
b. NATA guidelines
c. CDC guidelines
d. IATA guidelines

C.6 Standard precautions refers to:

a. Treating all body fluids including blood as potentially infectious
b. Wearing gloves at all times when handling patient samples
c. Ensuring all staff are aware of all laboratory hazards and have read the Health and Safety manual
d. Keeping all samples in appropriate leak proof containers.

C.7 What is the UN number for labelling packages containing Diagnostic Specimens Category A for air transport?

a. UN 3373
b. UN 1845
c. UN 2814
d. UN 2900

C.8 A Class 2 biosafety cabinet offers protection to:

a. Personnel only
b. Personnel and products
c. Products only
d. Personnel and environment

C.9 What laboratory department is generally responsible for the diagnosis of diabetes?

a. Microbiology
b. Histology
c. Blood Transfusion
d. Biochemistry

C.10 Where on the body is the antecubital fossa?

a. The leg

b. The arm

c. The waist

d. The neck

C.11 Why is it important to use personalised logons when using laboratory computer systems?

a. So management know which staff has achieved their KPIs.

b. So all entries in the computer are appropriately tracked in accordance with Total Quality Management

c. So HR know when staff are working and they can be paid the correct amount.

d. So you don't get the blame for other people's errors

C.12 Belonging to and achieving appropriate Continuing Professional Development is a legal requirement from which Government Act?

a. Health Practitioners Competency Assurance Act (2003)

b. Health and Disability Commissioner Act (1994)

c. Health and Safety at Work Act (2015)

d. Employment Relations Act (2000)

D.13 The test used to differentiate *Staphylococci sp.* from *Streptococci sp.*:

a. Coagulase

b. Oxidase

c. Catalase

d. Sensitivity to optochin.

D.14 What would you expect to see if you prepare a Gram stain slide of a staphylococcal species?

a. Corkscrew-shaped, purple rods

b. Round, purple cocci in clusters

c. Round, purple cocci in chains

d. Pink rod shapes

D.15 Which of the following are two positive carbohydrate reactions expected in the identification of *Neisseria meningitidis*?

a. Glucose positive, lactose positive

b. Glucose positive, sucrose positive

c. Glucose positive, maltose positive

d. Lactose positive, maltose positive

D.16 The atmospheric requirement for *Pseudomonas aeruginosa* to grow is?

a. Aerobic

b. Anaerobic

c. Microaerophilic

d. Capnophilic

D.17 What does MRSA stand for?

a. Methicillin Resistant Staphylococcal Aureus

b. Methyl Resistant Staphylococcal Aureus

c. Meropenem Resistant Staphylococcal Aureus

d. Mupirocin Resistant Staphylococcal Aureus

D.18 A stain that is used primarily to identify parasites is:

a. Spore stain

b. Gram stain

c. Trichrome stain

d. Flagella stain

D.19 A cellotape preparation or scotch tape test is used on a young child with anal itching to aid in diagnosis of infestation with which parasite?

a. *Giardia lamblia*

b. *Enterobius vermicularis*

c. *Cryptosporidium species*

d. *Blastocystis hominis*

D.20 A MALDI-TOF is an analyser used to identify bacteria. What does MALDI-TOF stand for?

a. Multi-Assisted Laser Desorption Ionization/Time Of Flight

b. Mass-Assisted Laser Desorption Ionization/Time Of Flight

c. Matrix-Assisted Laser Desorption Ionization/Time Of Flight

d. Matrix-Associated Laser Desorption Ionization/Time Of Flight

D.21 Which pathogen is often isolated from sore throats and may then go on to cause rheumatic fever?

a. *Haemophilus influenzae*

b. *Streptococcus pneumoniae*

c. *Streptococcus pyogenes*

d. *Streptococcus agalactiae*

D.22 Which yeast is mostly associated with the condition called acute vaginitis?

a. *Candida parapsillosis*

b. *Candida albicans*

c. *Candida glabrata*

d. *Candida krusei*

D.23 What is the causative agent of tuberculosis?

a. *Mycoplasma tuberculosis*

b. *Mycobacterium tuberculosis*

c. *Mycobacterium pseudotuberculosis*

d. *Yersinia pseudotuberculosis*

D.24 Selenite F broth is used for isolation of faecal enteric pathogens. It is:

a. Enrichment broth

b. Selective broth

c. Differential broth

d. Chromogenic broth

D.25 A medium suitable for a disc diffusion antimicrobial susceptibility test for Enterobacterales is?

a. Chocolate agar

b. MacConkey agar

c. Mueller Hinton agar

d. Aztreonam agar

D.26 A reagent used for Gram staining bacteria is:

a. Malachite green

b. Acridine orange

c. Methylene blue

d. Crystal violet

D.27 Describe the microscopic appearance of *Moraxella catarrhalis*:

a. Gram negative diplococci

b. Gram positive cocci in clusters

c. Gram negative rods

d. Gram positive cocci in chains

D.28 The biochemical name of oxidase reagent is:

a. Tetramethyl-o-phenylene-diamine-dihydrochlorite

b. Tetramethyl-p-phenylene-triamine-dihydrochlorite

c. Tetramethyl-o-phenylene-triamine-dihydrochlorite

d. Tetramethyl-p-phenylene-diamine-dihydrochlorite

D.29 The fluid from a knee joint is known as:

a. Pericardial fluid

b. Synovial fluid

c. Pleural fluid

d. Ascites fluid

D.30 The causative agent of whooping cough is:

a. *Bordetella pertussis*

b. *Haemophilus influenzae*

c. *Haemophilus parainfluenzae*

d. *Staphylococcus saprophyticus*

Section A: Total 15 marks

SECTION B

Labelling of Diagrams, e.g., Anatomy, Hazard Identification, Instrument

Common Curriculum Questions C.31 - C.33 = 5 marks
Discipline Specific Questions D.34 = 5 marks

(Answer all questions)
Total Marks = 10 marks

C.31 Name the following hazard symbols *(0.5 marks per correct answer)*
(C.31: 1.5 marks)

a. 

b. 

c. 

a. _____ b._____ c. _____

C.32 Name the equipment pictured below. *(0.5 marks per correct answer)*
(C.32: 1.5 marks)

a. 

b. 

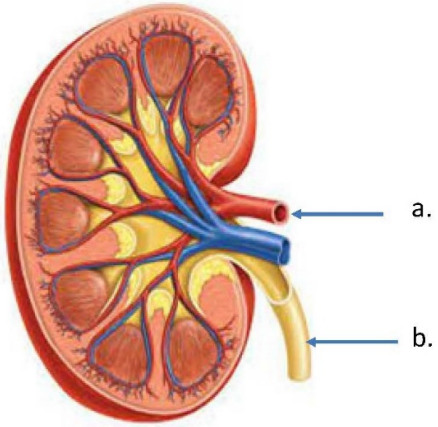
c 

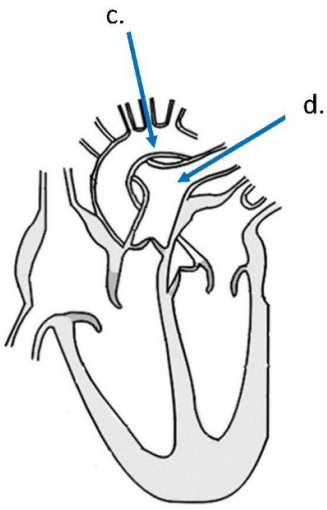
a. _____ b._____ c. _____

C.33 Name the anatomical features pictured below, indicated by a, b, c and d.

(0.5 marks per correct answer)

(C.33: 2 marks)



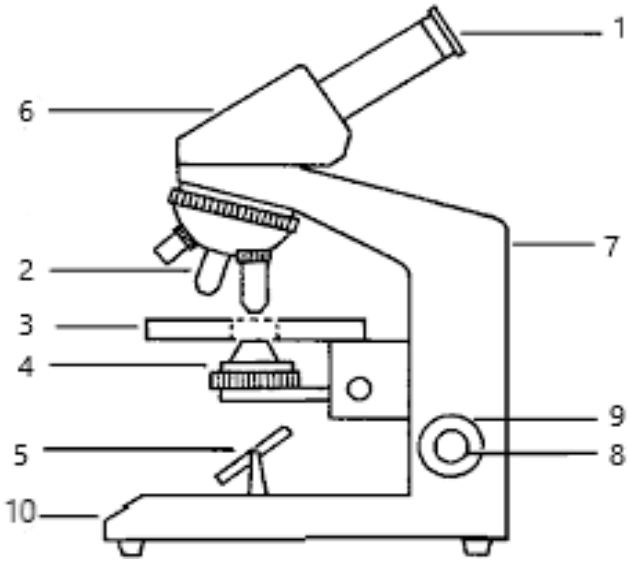


a. _____ c. _____

b. _____ d. _____

D. 34 Name the parts of the microscope. *(0.5 marks per correct answer)*

(D.34: 5 marks)



1. _____ 2. _____

3. _____ 4. _____

5. _____ 6. _____

7. _____ 8. _____

9. _____ 10. _____

Section B: Total 10 marks

SECTION C

Tables, Match Column Definition

Common Curriculum Questions C.35 - C.36 = 4 marks
Discipline Specific Questions D.37 = 6 marks

(Answer all questions)
Total Marks = 10 marks

C.35 Match the definition in column (A) with the correct description in column (B).
Write your answers in the table below. (Roman numeral only required.)

(0.5 marks per correct answer)
(C.35 2 marks)

A	B
Accuracy	(i) Nose bleed
Morphology	(ii) Inflammation of the Kidney
Epistaxis	(iii) The science of organic forms and structure
Nephritis	(iv) The ability of a measurement to match the actual value of the quantity being measured

A	B (enter Roman numeral only)
Accuracy	
Morphology	
Epistaxis	
Nephritis	

C.36 Expand the following commonly used laboratory abbreviations. There are both laboratory tests and clinical conditions/details. *(0.5 marks per correct answer)*

(C.36: 2 marks)

MI _____

UTI _____

PPE _____

PCR _____

D.37 Match the causative organism from list A to the disease in list B.
Write your answers in the table below. (Roman numeral only required.)

(0.5 marks per correct answer)

(D.37: 6 marks)

A	B
1. *Staphylococcus* aureus	i. Food poisoning
2. *Streptococcus pyogenes*	ii. Cellulitis
3. *Microsporum canis*	iii. Endocarditis
4. *Proteus mirabilis*	iv. Sexually transmitted infection
5. *Haemophilus influenzae*	v. Ringworm
6. *Neisseria meningitidis*	vi. Rheumatic fever
7. *Group B Streptococcus*	vii. Nephritis
8. *Streptococcus mitis*	viii. Conjunctivitis
9. *Campylobacter jejuni*	ix. Haemolytic-Uraemic syndrome (HUS)
10. *Chlamydia trachomatis*	x. Cholera
11. *Vibrio cholerae*	xi. Meningitis
12. *E. coli* 0157 H7	xii. Neonatal sepsis

A	B (enter Roman numeral only)
1. *Staphylococcus* aureus	
2. *Streptococcus pyogenes*	
3. *Microsporum canis*	
4. *Proteus mirabilis*	
5. *Haemophilus influenzae*	
6. *Neisseria meningitidis*	
7. *Group B Streptococcus*	
8. *Streptococcus mitis*	
9. *Campylobacter jejuni*	
10. *Chlamydia trachomatis*	
11. *Vibrio cholerae*	
12. *E. coli* 0157 H7	

Section C: Total 10 marks

SECTION D

Calculations

Common Curriculum Questions C.38 - C.41 = 5 marks
Discipline Specific Questions D.42 - D.43 = 5 marks

(Answer all questions)
(Use of a calculator is permitted)

Total Marks = 10 marks

C.38 A patient needs a specimen taken within 36 hours of flying to meet with travel requirements. They fly at 2130 hr on the 10TH of November.

When is the earliest they can have the specimen collected? Give the date and time.

(C.38: 1 mark)

_____

_____

_____

C.39 A department needs to demonstrate an increase in workload and is asked to calculate the average number of specimens received for the week.

Day of the week	Monday	Tuesday	Wednesday	Thursday	Friday
Specimens per day	227	243	217	209	186

What is the mean number of samples per day? (*Show calculations.)* **(C.39: 1 mark)**

_____

_____

_____

_____

C.40 Convert the following: **(C.40: 2 marks)**

0.75 L	to	_____ mL
1/4	to	_____ %
142ug	to	_____ g
185cm	to	_____ mm

C.41 Solve the following equation: *(0.5 marks per correct answer)*
(C.41: 1 mark)

1/3 + 5/8 = _____

Express the above result as a percentage.

_____

D.42 **(D.42: 3 marks)**

a. Manual cell counts are performed using a hemocytometer. *(1.5 marks)*

10 ml of synovial fluid is received by the laboratory for the investigation of a knee joint infection.
To count the WBCs, the sample is diluted 1 in 100

Use the following equation to calculate the WBC count if 150 cells are counted in 4 large squares with a chamber depth of 0.1 mm:

$$\text{Cells}/\mu L = \frac{\text{number of cells counted} \times \text{dilution factor}}{\text{number of large squares counted x chamber depth (mm)}}$$

(*Show calculations.)*

b. For the above same fluid calculate the total RBC count if the sample is undiluted and 80 cells are counted in five (5) squares with a chamber depth of 0.004 mm.
(Show calculations.) *(1.5 marks)*

D.43 Perform the manual calculations for the following CSF cell counts. **(D.43: 2 marks)**

a. The CSF is diluted 1 in 2 with Turk's fluid to count the white cells.
18 white cells were counted in 4 large squares, with a chamber depth of 0.1 mm. Calculate the white cell count. *(Show workings.)* *(1 mark)*

b. There were 308 red cells counted in 2 squares, with a chamber depth of 0.004 mm and the sample was diluted 1 in 10.
What is the red cell count for the CSF? *(Show workings.)* *(1 mark)*

Section D: Total 10 marks

SECTION E

Short Answer Questions

Common Curriculum Questions C.44 - C.48 = 10 marks
Discipline Specific Questions D.49- D.53 = 25 marks

(Answer all questions)
Total Marks = 35 marks

C.44 Define Quality Assurance: **(C.44: 1.5 marks)**

_____

_____

_____

_____

_____

_____

C.45 Describe the "Duty of Care" in relation to patient samples: *(0.5 marks per point. Max. 2 marks)*
(C.45: 2 marks)

_____

_____

_____

_____

_____

_____

C.46 List 3 routes of infection from biological material: *(0.5 marks per point. Max. 1.5 marks)*
(C.46: 1.5 marks)

_____

_____

_____

_____

_____

_____

C.47 Outline the prevention of a sharps injury: *(0.5 marks per point. Max. 2 marks*)
(C.47: 2 marks)

C.48 Describe Cultural Competence: **(C.48: 3 marks)**

D.49 Briefly describe the principle an Enzyme Immunoassay test, including an example of what the test would be used for in a microbiology laboratory: **(D.49: 5 marks)**

D.50 Describe the principle of the following media and tests *(1 mark)*. List a negative and positive control for each *(1 mark).* *(2 marks per correct answer)*

(D.50: 8 marks)

a. CLED agar-Cysteine Lysine Electrolyte Deficient Agar

b. Neomycin sulphate

c. Dermatophyte Test Medium

d. Catalase

D.51 Define the following terms: *(1 mark per correct answer)*

(D.51: 4 marks)

a. Anaerobe

b. Microaerophilic

c. Capnophilic

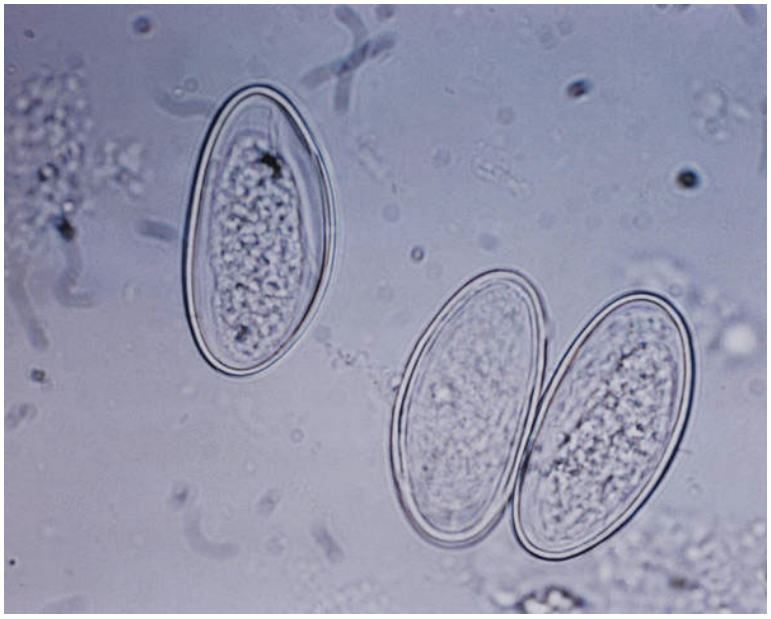
d. Aerobic

D.52 Describe the principle and method of the Gram stain: **(D.52: 5 marks)**

D.53 Identify the parasite or fungi in each picture: *(0.5 marks per correct answer)*

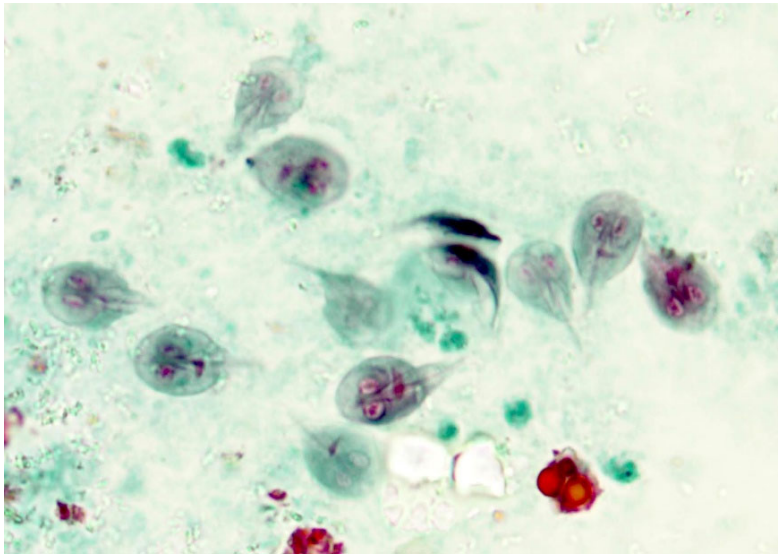
(D.53: 3 marks)

a.



a. _____

b.

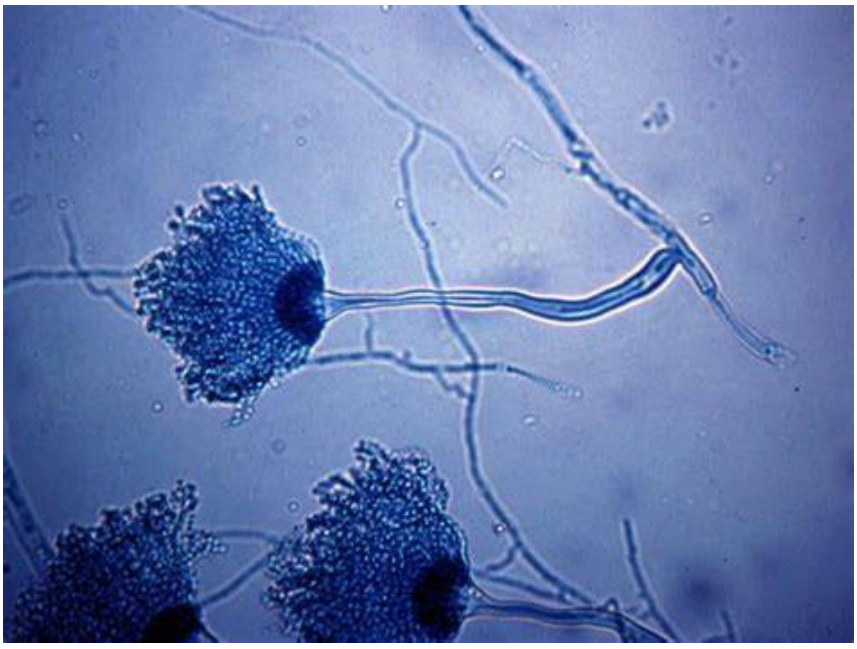


b. _____

c.

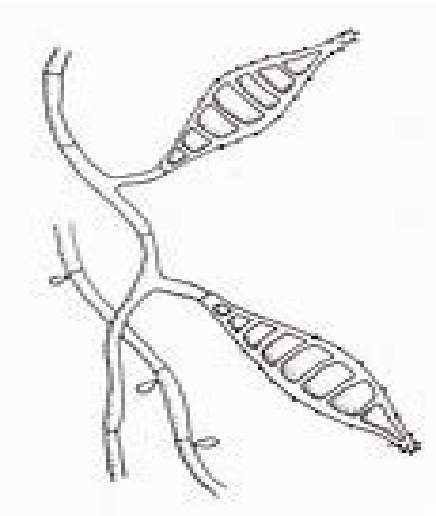
c. _____

d.



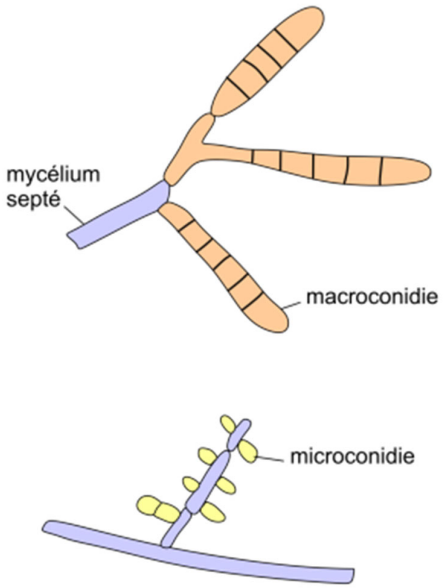
d. _____

e.



e. _____

f.



f. _____

Section E: Total 35 marks

SECTION F

Essay Questions

Discipline Specific Questions D.54 - D.55 = 20 marks

(Answer all questions)

Total Marks = 20 marks

D.54 In essay format outline the process of identifying a suspect *Candida albicans* by describing a manual method versus an automated system. **(D.54: 10 marks)**

D.55 A CSF sent to the laboratory from a new born infant grows *Streptococcus agalactiae*. In essay format describe the organism and its laboratory diagnosis. **(D.55: 10 marks)**

Section F: Total 20 mar

Candidate No.: _____

Question No:	

Candidate No.: _____

Question No:	

Candidate No.: _____

Question No:	

Candidate No.: _____

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