



The University of Fiji
(An Entity of Arya Pratinidhi Sabha of Fiji)



Umanand Prasad School of Medicine and Health Sciences
2025

FINAL EXAMINATION PAPER

MICR 202: HUMAN MICROBIOLOGY

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours) to complete this paper**.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. This paper contains four (4) sections A, B, C and D. All questions are compulsory to answer **except** section A and D have choices.
6. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
7. This is a **Closed Book Examination**. The University views plagiarism, cheating and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1-40	Multiple Choice	40	60 minutes
B	41-50	Short Answer Questions	20	40 minutes
C	51-54	Long Answer Questions	20	40 minutes
D	55-60	Essays (Choose Any TWO out of Six questions)	20	40 minutes
		TOTAL	100	180 Minutes

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Registration Certificate Number (RGN0020/11)*

SECTION A: MULTIPLE CHOICE (40 Marks)

(Circle the letter of your answer in the answer grid provided)

1. Which of the following structures contains genes for enzymes and antibiotic resistance?

- a. Plasmid
- b. Pilus
- c. Capsule
- d. Plasma Membrane

2. Which of the following is an example of temperate virus inclusion into bacterial genome?

- a. Streptococcal M-Protein expression
- b. Clostridium difficile toxigenicity
- c. *E. coli*, O and H antigenicity
- d. Staphylococcal hemagglutinin expression

3. Which of the following is not a gram-negative bacterium?

- a. *Clostridium perfringens*
- b. *Vibrio cholerae*
- c. *Escherichia coli*
- d. *Bordetella pertussis*

4. Which of the following is not true related to endotoxins?

- a. Produced by gram negative microorganisms
- b. Endotoxins are secreted from cells.
- c. Can be linked to Meningococemia
- d. Can cause fever

5. Which of the following microorganisms stain well with the gram stain?

- a. *Escherichia coli*
- b. *Mycoplasma pneumoniae*
- c. *Treponema*
- d. *Chlamydia*

6. Which of the following microorganisms are not matched correctly with the appropriate isolation media?

- a. Fungi – Sabouraud's Dextrose agar
- b. *Neisseria gonorrhoeae* – MacConkey agar
- c. *Haemophilus influenzae* – Chocolate agar
- d. *Mycobacterium tuberculosis* – Lowenstein-Jensen agar

7. Which of the following diseases and bacteria are matched up incorrectly?

- a. Cellulitis – *Staphylococcus aureus*
- b. Gonorrhoea – *Neisseria gonorrhoeae*
- c. Gastritis – *Helicobacter pylori*
- d. Lyme disease – *Yersinia pestis*

8. Which of the following diseases and agents are matched up incorrectly?

- a. *Treponema pallidum* – Syphilis
- b. *Tinea vesicolor* – Dhani
- c. *Streptococcus pyogenes* – Tonsillitis
- d. *Yersinia enterocolitica* – Diphtheria

9. Which of the following is not true concerning *Staphylococcus aureus*?

- a. *S. aureus* is related to inflammation.
- b. *S. aureus* can cause pneumonia
- c. *S. aureus* can lead to acute bacterial endocarditis
- d. *S. aureus* does not make coagulase

10. Which of the following signs and symptoms is not linked to *Haemophilus influenzae*?

- a. Otitis media
- b. Pneumonia
- c. Stomatitis
- d. Epiglottitis

11. The *Aedes aegypti* mosquito is NOT a transmission vector for which of the following diseases?

- a. Chikungunya
- b. Malaria
- c. Dengue
- d. Zika

12. Which of the following diseases and vectors is mis-matched?

- a. Culex mosquito – Lymphatic filariasis
- b. Tsetse fly – African sleeping sickness
- c. Ixodes ticks – Yellow fever
- d. Rat flea – Plague

13. Which of the following is not a 'Neglected Tropical Disease'?

- a. Soil-transmitted Helminthiasis
- b. Trachoma
- c. Leptospirosis
- d. Scabies

14. Which of the following is not a fungal pathogen?

- a. *Cryptococcus neoformans*
- b. *Taenia saginata*
- c. *Tinea nigra*
- d. *Aspergillus fumigatus*

15. Which of the following viruses do **not** exhibit symptoms of rash or bumps on the skin?

- a. Measles
- b. Monkey pox
- c. Adenovirus
- d. Rubella

16. Which virus is responsible for causing rabies?

- a. Poxvirus
- b. Rhabdovirus
- c. Herpesvirus
- d. Arenavirus

17. Which of the following viruses is associated with cervical cancer?

- a. Epstein-Barr Virus
- b. Parvovirus
- c. Papillomavirus
- d. Herpesvirus

18. Which of the following viruses causes severe acute respiratory syndrome?
- Adenovirus
 - Rhinovirus
 - Influenza virus
 - Coronavirus
19. Which of the following statements best describes prions?
- They are toxins that infect neural tissue
 - They are misfolded proteins that can induce abnormal folding in normal proteins
 - They are toxins that cause neurodegeneration
 - They are toxic protein particles that replicate independently
20. Which of the following microorganisms has not been linked to UTI's?
- Escherichia coli*
 - Pseudomonas aeruginosa*
 - Klebsiella pneumoniae*
 - Haemophilus influenzae*
21. Which of the following is true of fungal cell walls?
- Contain peptidoglycan
 - Contain cholesterol
 - Contain ergosterol
 - Contain mycolic acid
22. Which protozoan is responsible for causing gastrointestinal infections?
- Giardia lamblia*
 - Trichomonas hominis*
 - Trypanosoma brucei*
 - Plasmodium falciparum*
23. Which protozoan causes amoebic dysentery?
- Cryptosporidium parvum*
 - Entamoeba histolytica*
 - Toxoplasma gondii*
 - Taenia solium*
24. Which protozoan is transmitted by the tsetse fly?
- Plasmodium vivax*
 - Leishmania tropica*
 - Entamoeba coli*
 - Trypanosoma brucei*

25. Which protozoan causes giardiasis?

- a. *Trichomonas vaginalis*
- b. *Balantidium coli*
- c. *Giardia lamblia*
- d. *Naegleria fowleri*

26. Which class of antibiotics inhibits bacterial cell wall synthesis?

- a. Beta-lactams
- b. Aminoglycosides
- c. Macrolides
- d. Tetracyclines

27. Which antiviral drug is commonly used to treat herpes simplex virus infections?

- a. Ribavirin
- b. Zidovudine
- c. Acyclovir
- d. Oseltamivir

28. Albendazole is primarily used to treat infections caused by which type of pathogen?

- a. Fungi
- b. Helminths
- c. Viruses
- d. Protozoa

29. Which of the following is a component of innate immunity?

- a. T Cells
- b. Macrophages
- c. B-cells
- d. Plasma cells

30. Which immunoglobulin is primarily involved in mucosal immunity?

- a. IgE
- b. IgA
- c. IgM
- d. IgG

31. Which antifungal agent targets ergosterol synthesis in fungal cell membranes?
- a. Griseofulvin
 - b. Caspofungin
 - c. Fluconazole
 - d. Amphotericin B
32. Metronidazole is effective against which group of pathogens?
- a. Gram positive bacteria
 - b. Acid-fast bacteria
 - c. Anaerobic bacteria and protozoa
 - d. Gram negative bacteria
33. Which cell type is responsible for antigen presentation to T-Cells?
- a. Eosinophils
 - b. Neutrophils
 - c. Basophils
 - d. Dendritic cells
34. Which cytokine is most associated with fever and inflammation in innate immunity?
- a. IL-1
 - b. IL-2
 - c. IL-4
 - d. IL-10
35. Which of the following is a hallmark of acquired immunity?
- a. Physical barriers
 - b. Non-specific recognition
 - c. Memory formation
 - d. Immediate response
36. Which complement pathway is activated by antigen-antibody complexes?
- a. Intrinsic pathway
 - b. Lectin pathway
 - c. Classical pathway
 - d. Alternative pathway

37. Which technique is commonly used to amplify DNA sequences in molecular diagnostics?

- a. ELISA
- b. Western Blot
- c. Flow cytometry
- d. PCR

38. What does a positive result in a real-time PCR assay typically indicate?

- a. Presence of antibodies
- b. Presence of target nucleic acid
- c. Protein expression levels
- d. Cell viability

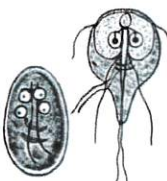
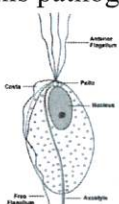
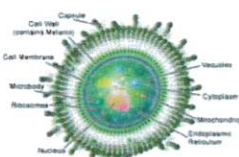
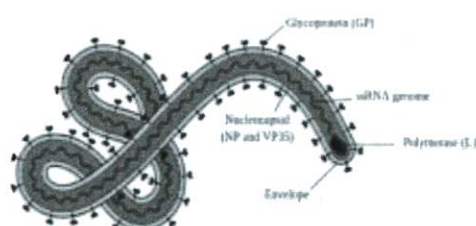
39. What is the principle behind the use of probes in molecular diagnostics?

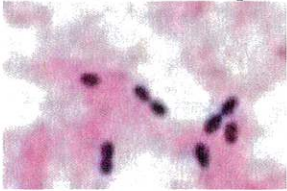
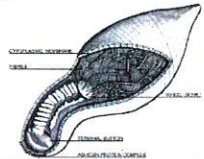
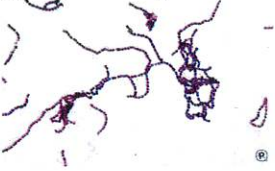
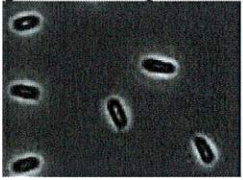
- a. Enzyme inhibition
- b. Antigen-antibody binding
- c. Nucleic acid hybridization
- d. Protein denaturation

40. Which developmental structure is often targeted in chick embryo molecular studies?

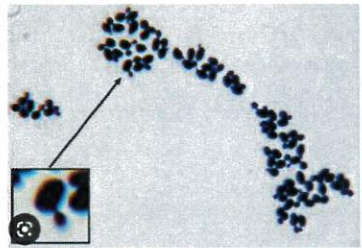
- a. Liver
- b. Heart
- c. Neural tube
- d. Kidney

SECTION B: SHORT ANSWER QUESTIONS (20 Marks)

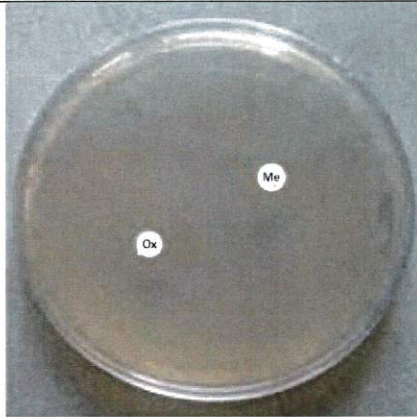
41.	a) What specimen should be collected to identify this pathogen?  <i>Giardia intestinalis</i>	b) What is the mode of transmission of this pathogen?
42.	a) What is the mode of transmission of this pathogen?  <i>Trichomonas vaginalis</i>	b) What is the best specimen to collect for diagnosis?
43.	a) What type of host does this pathogen usually infect?  <i>Cryptococcus neoformans</i>	b) What is the meaning of dimorphism as it applies to this pathogen?
44.	a) What specimen is collected to diagnose an infection with this organism?  <i>Leptospira interrogans</i>	b) What is the usual reservoir for this pathogen?
45.	a) What types of infections does this agent cause?  Ebola virion	b) What PPE should be worn when handling patients infected with this pathogen?

46.	a) This organism was isolated from the CSF of a patient with meningitis. Identify its Gram Stain morphology 	b) What is a likely pathogen fitting the description?
47.	a) This bacterium was found to cause 'walking pneumonia' in a 45-year-old man. Sputum cultures were negative and Gram and ZN stain of the sputum did not show any organisms. How is this possible? 	b) The man later developed haemolytic anaemia. What is the agent causing haemolytic anaemia?
48.	a) Describe the Gram stain morphology of this organism which usually causes glomerulonephritis. 	b) what is the possible genus and species of the organism?
49.	a) Spore-forming gram-positive bacilli were isolated in a case of antibiotic-associated diarrhoea. What is the likely genus and species of the organism? 	b) What is causing the symptoms of diarrhoea?
50.	a) Name the nutrient biochemicals found in this agar (chocolate brown in colour) which facilitate the growth of fastidious microorganisms? 	b) name the genus of 2 organisms which are commonly isolated from this agar.

SECTION B: LONG ANSWER QUESTIONS (20 Marks)

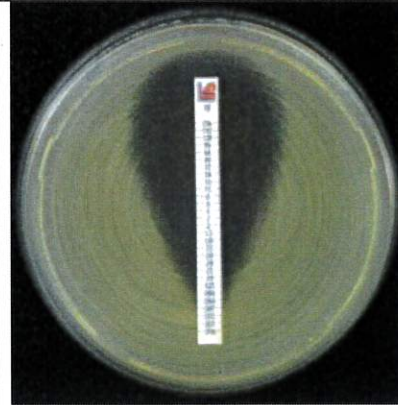
51.		a) This is an example of an antigen/ antibody capture test. Describe the principle of the test. (2 marks) b) What is the advantage of using such tests for diagnostic purposes? (2 marks) c) How are 'T' and 'C' used in test interpretation? (2 Marks) d) This is an example of a Qualitative test. What is the meaning of 'qualitative' compared to 'quantitative' test/ result? (2 marks)
52.	 A 68-year-old male with a history of diabetes and recent abdominal surgery is admitted to the ICU for septic shock. He has a central venous catheter and has been on broad-spectrum antibiotics for 10 days. Blood cultures reveal the above organism at 40x magnification.	e) Blood cultures reveal a pathogen that is not easily identified by standard laboratory methods. Describe the organism morphology and explain the importance of 'dimorphism'. (2 marks) f) The organism was identified as <i>Candida auris</i>. Why is this organism considered an 'emerging' public health threat? (2 Marks)

53.



This plate shows a lawn of *Staphylococcus aureus* growth against the antibiotics Methicillin and Oxacillin.

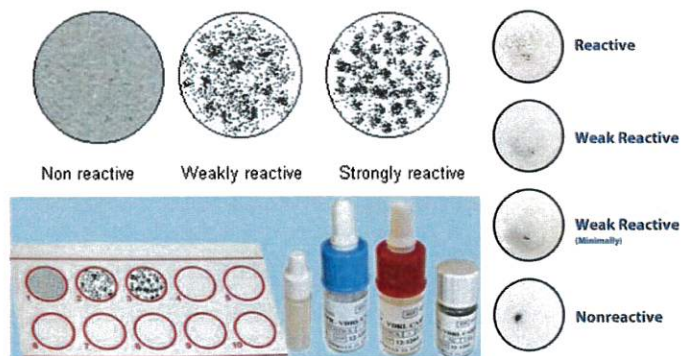
- a) Name this test. (1 Mark)
- b) What can we conclude about the *S. aureus*? (1 Mark)



This plate shows a different kind of test using the same organism.

- e. Name this test (1 Mark)
- f. What is the principle of this test? (2 Marks)

54.



- a) The VDRL test is a particle agglutination test for syphilis. Patient A's sample was shown to be reactive to 1:4 dilutions while patient B's sample was reactive 1:64. Which patient (A or B) has a more severe infection? (1 Mark)
- b) Explain how serological tests allow us to 'quantify' degrees of infectivity. (2 Marks)

SECTION D: ESSAY QUESTIONS (20 Marks)

You have a choice to answer any **two** out of six (2/6) questions. Each question is worth 10 Marks.

55. Using appropriate examples, discuss the various methods of gene transfer among bacteria contributing to the growing cases of antimicrobial resistance. (10 Marks)

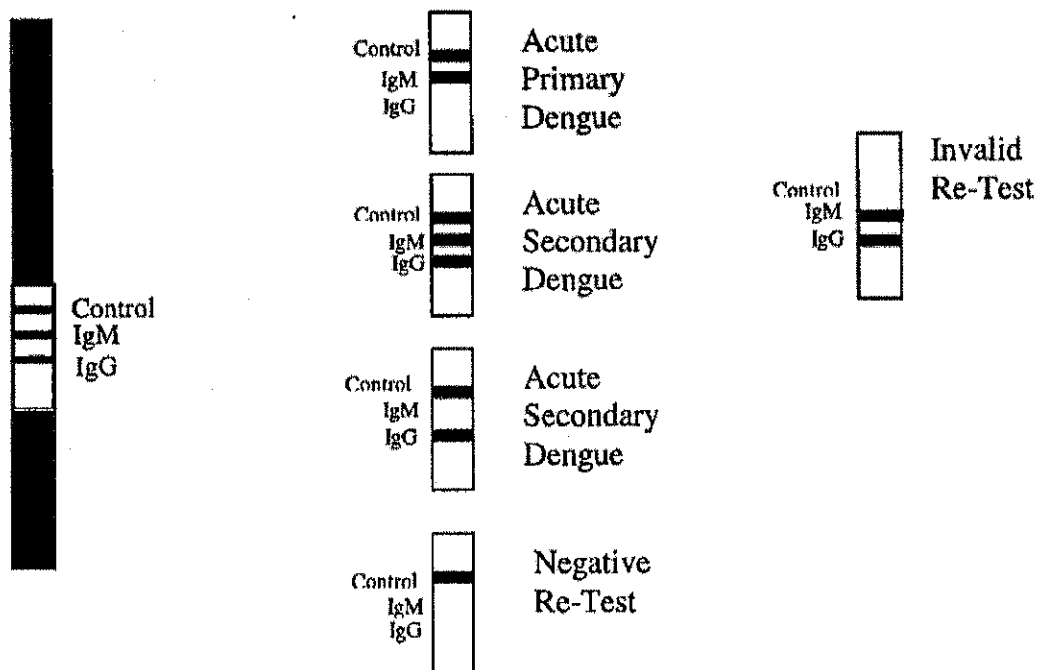
56. Describe the epidemiological triad. Using an infectious agent of your choice (prions, viruses, bacteria, fungi, protozoa or helminths), describe their pathogenesis, diagnosis, management and prevention. (10 Marks).

57. Using one organ or system as an example; describe the non-specific and specific barriers that pathogens would have to overcome in order to cause disease. For this organ or system, provide the example with either a bacterial, viral, parasitic, protozoan or fungal infection. (10 Marks)

58. Using appropriate examples, discuss the difference between: Natural Active and Natural Passive immunity and compare with Artificial Active and Artificial Passive Immunity. (10 Marks)

59. Using appropriate examples, discuss how normal flora can become opportunistic pathogens and cause not only localized infections, but also systemic infections. (10 marks)

60. Using the example of the diagram provided, discuss the diagnostic significance of antigen or antibody levels during acute primary infections, acute secondary infections, negative, test results and invalid test results. (10 Marks)





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UMANAND PRASAD SCHOOL OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF BASIC SCIENCES

YEAR 2025

MICR 202: MCQ ANSWER SHEET

Student Name: _____

Student ID: _____

(Circle the correct answer. Only one choice is valid for each question.)

1.	A	B	C	D
2.	A	B	C	D
3.	A	B	C	D
4.	A	B	C	D
5.	A	B	C	D
6.	A	B	C	D
7.	A	B	C	D
8.	A	B	C	D
9.	A	B	C	D
10.	A	B	C	D
11.	A	B	C	D
12.	A	B	C	D
13.	A	B	C	D
14.	A	B	C	D
15.	A	B	C	D
16.	A	B	C	D
17.	A	B	C	D
18.	A	B	C	D
19.	A	B	C	D
20.	A	B	C	D

21.	A	B	C	D
22.	A	B	C	D
23.	A	B	C	D
24.	A	B	C	D
25.	A	B	C	D
26.	A	B	C	D
27.	A	B	C	D
28.	A	B	C	D
29.	A	B	C	D
30.	A	B	C	D
31.	A	B	C	D
32.	A	B	C	D
33.	A	B	C	D
34.	A	B	C	D
35.	A	B	C	D
36.	A	B	C	D
37.	A	B	C	D
38.	A	B	C	D
39.	A	B	C	D
40.	A	B	C	D