



UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION
MARCH 2025 SEMESTER

COURSE CODE : HDB10503
COURSE TITLE : BASIC MICROBIOLOGY
PROGRAMME NAME : BACHELOR OF BIOMEDICAL SCIENCE (HONOURS)
DATE : 21 JUNE 2025
TIME : 9:00AM - 12:00PM
DURATION : 3 HOURS



INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. *Tick if applicable*
9. Refer to the attached Formula/ Appendies. *Tick if applicable*

THERE ARE 13 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

1. Detection of _____ in soil indicates soil contamination.
 - A. *Cryptosporidium parvum*
 - B. *Giardia lamblia*
 - C. *Blastocystis*
 - D. *Ascaris lumbricoides*

2. A positive catalase test is observed as _____.
 - A. red color
 - B. gas bubbles
 - C. yellow ring
 - D. blue color

3. Which reagent is used in the catalase test?
 - A. Kovac's reagent
 - B. Methyl red
 - C. Hydrogen peroxide
 - D. Iodine

4. What is the function of HEPA filters in microbial control?
 - A. Destroy bacteria chemically
 - B. Capture microbes from air
 - C. Kill viruses
 - D. Inactivate spores

5. How does UV radiation control microbial growth?
 - A. Denatures proteins
 - B. Disrupts cell wall
 - C. Damages DNA
 - D. Alters cell metabolism

6. Which is the most resistant microbial form to chemical antimicrobials?
 - A. Gram-positive bacteria
 - B. Bacterial endospores
 - C. Fungi
 - D. Viruses

7. Which chemical agent is commonly used as a skin antiseptic?
 - A. Iodine
 - B. Mercury chloride
 - C. Ethylene oxide
 - D. Formaldehyde

8. How do alcohol-based antiseptics work?
 - A. Form free radicals
 - B. Denature proteins and dissolve lipids
 - C. Break down cell walls
 - D. Oxidize DNA

9. The minimal time needed to kill all organisms at a given temperature is called _____.
- A. decimal reduction time
 - B. incubation time
 - C. thermal death time
 - D. thermal death point
10. Which method is used to sterilize heat-sensitive liquids?
- A. Incineration
 - B. Filtration
 - C. Boiling
 - D. Radiation
11. Microbes that grow in the absence of oxygen are called _____.
- A. microaerophiles
 - B. anaerobes
 - C. aerobes
 - D. facultative anaerobes
12. A medium that allows the growth of some organisms while inhibiting others is called _____.
- A. enriched
 - B. selective
 - C. differential
 - D. transport

13. What type of organisms require high salt concentrations to grow?
- A. Acidophiles
 - B. Halophiles
 - C. Thermophiles
 - D. Psychrophiles
14. Which gas is essential for aerobic microbial growth?
- A. Oxygen
 - B. Nitrogen
 - C. Carbon dioxide
 - D. Hydrogen
15. Which of the following is a solidifying agent in culture media?
- A. Agar
 - B. Peptone
 - C. Glucose
 - D. Sodium chloride
16. Obligate aerobes _____.
- A. require oxygen to grow
 - B. are killed by oxygen
 - C. grow with or without oxygen
 - D. grow only without oxygen

17. Which phase shows a balance between cell death and cell division?
- A. Death phase
 - B. Lag phase
 - C. Log phase
 - D. Stationary phase
18. A medium that changes color to indicate microbial activity is called _____ medium.
- A. selective
 - B. anaerobic
 - C. enriched
 - D. differential
19. How does temperature affect microbial growth?
- A. It prevents replication
 - B. It changes nutrient composition
 - C. It affects membrane fluidity and enzyme function
 - D. It alters DNA sequence
20. Which phase of the bacterial growth curve involves active cell division?
- A. Log phase
 - B. Death phase
 - C. Stationary phase
 - D. Lag phase

21. What is the term for microbes that grow best at moderate temperatures (20–45°C) ?
- A. Hyperthermophiles
 - B. Psychrophiles
 - C. Thermophiles
 - D. Mesophiles
22. Which statement best describes an ectoparasite?
- A. Lives within host cells
 - B. Does not require a host
 - C. Lives on the surface of the host
 - D. Lives inside host tissues
23. Parasites that live inside the host's body are called _____.
- A. Ectoparasites
 - B. Endoparasites
 - C. Commensals
 - D. Facultative parasites
24. Which medium is most suitable to grow fungi in the lab?
- A. MacConkey agar
 - B. Mannitol salt agar
 - C. Nutrient agar
 - D. Sabouraud dextrose agar

25. Which of the following groups includes edible mushrooms?
- A. Basidiomycota
 - B. Ascomycota
 - C. Zygomycota
 - D. Deuteromycota
26. Filaments of fungi are called _____.
- A. septa
 - B. mycelium
 - C. hyphae
 - D. chitin
27. Non-autoclavable items include _____.
- A. culture media
 - B. beakers
 - C. pipette tips
 - D. serum
28. Yeasts reproduce mainly by _____.
- A. mitosis
 - B. budding
 - C. spore formation
 - D. binary fission

29. A patient has pneumonia. Lab results show Gram-positive cocci. What's a likely cause?
- A. *Salmonella typhi*
 - B. *Mycobacterium tuberculosis*
 - C. *Escherichia coli*
 - D. *Streptococcus pneumoniae*
30. Which of the following is a defining feature of organisms classified under the domain *Eukarya*?
- A. They have no nucleus and reproduce only asexually
 - B. They have membrane-bound organelles, including a nucleus
 - C. They are all unicellular and lack mitochondria
 - D. They contain peptidoglycan in their cell walls
31. What is the correct order of taxonomic hierarchy from highest to lowest?
- A. Species > Genus > Family > Order > Class > Phylum > Kingdom
 - B. Kingdom > Class > Order > Family > Phylum > Genus > Species
 - C. Kingdom > Class > Phylum > Order > Genus > Family > Species
 - D. Kingdom > Phylum > Class > Order > Family > Genus > Species
32. What is the color change for a positive indole test?
- A. Blue ring
 - B. Green ring
 - C. Yellow ring
 - D. Red ring

33. Which biochemical test uses Kovac's reagent?
- A. Citrate
 - B. Indole
 - C. Methyl red
 - D. Urease
34. The microscopic count of fungal spores can be done by _____.
- A. autoclave
 - B. hemocytometer
 - C. freeze dryer
 - D. spectrophotometer
35. Which test detects the production of acid from glucose fermentation?
- A. Voges-Proskauer test
 - B. Indole test
 - C. Methyl red test
 - D. Citrate test
36. The oxidase test is used to identify bacteria that produce _____.
- A. Peroxidase
 - B. Nitrate reductase
 - C. Amylase
 - D. Cytochrome c oxidase

37. Black precipitate in TSI indicates the production of _____.
- A. Hydrogen gas
 - B. Ammonia
 - C. Acetoin
 - D. Hydrogen sulfide
38. A negative oxidase test shows _____.
- A. bubble formation
 - B. no color change
 - C. red color
 - D. gas production
39. Predict the result if the iodine step is left out during the Gram's staining process.
- A. Gram's positive cells would look Gram's negative.
 - B. Gram's negative cells would look Gram's positive.
 - C. All cells would be colorless.
 - D. All rods would be in pink.
40. Identify the example of carbon source in a culture medium.
- A. Yeast extract
 - B. Magnesium sulfate
 - C. Sucrose
 - D. Sodium nitrate

SECTION B (Total: 60 marks)

Answer **THREE (3)** questions only.

Please use the answer booklet provided.

Question 1

Answer all questions.

- i. List down five major biogeochemical cycles. (5 marks)

- ii. Describe the roles in microorganisms in nitrogen cycle. (15 marks)

Question 2

Answer all questions.

- i. List down five mechanisms of action of antibiotics. (10 marks)

- ii. Briefly explain the disk diffusion (Kirby-Bauer) procedure. (10 marks)

Question 3

Answer all questions.

i. Explain the principal of Gram's staining. (5 marks)

ii. Explain the procedures involved in Gram's staining. (15 marks)

Question 4

Answer all question.

i. Define the bacterial growth curve and briefly describe its four main phases. (10 marks)

ii. Explain any five factors that influence the growth of bacteria. Provide a brief description of how each factor affects bacterial growth. (10 marks)

END OF EXAMINATION PAPER

