

2407/305
MEDICAL MICROBIOLOGY
Oct./Nov. 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

MEDICAL MICROBIOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

This paper consists of TWO sections; A and B.

Answer ALL the questions in section A and any THREE questions from section B in the answer booklet provided.

Each question in section A carries 4 marks, while each question in section B carries 20 marks.

Maximum marks for each part of a question are indicated.

Candidates should answer the questions in English.

This paper consists of 4 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A (40 marks)

Answer ALL the questions in this section.

1. State the function of the following in staining technique:
 - (a) mordant; (2 marks)
 - (b) decolourizer. (2 marks)
2. Give reason as to why the following specimens should be marked as "HIGH RISK":
 - (a) sputum;
 - (b) faecal specimen;
 - (c) fluids from wounds;
 - (d) blood. (4 marks)
3. Name four gastrointestinal viruses associated with diarrhoea in adults. (4 marks)
4. State two advantages and two disadvantages of culture methods in microbial identification. (4 marks)
5. Outline the procedure of inoculating butt and slant. (4 marks)
6. Explain the purpose of potassium hydroxide (KOH) mount in mycology. (4 marks)
7. Explain the role of β -lactamase in drug resistance. (4 marks)
breakdown beta lactam ring.
8. Explain the principle of Aesculin test. (4 marks)
9. Name the vector species involved in transmission of each of the following diseases:
 - (a) Murine endemic typhus;
 - (b) Epidemic typhus;
 - (c) Rocky mountain spotted fever.
 - (d) Plaque. (4 marks)
10. Identify the organism diagnosed by the following:
 - (a) Form swarming colonies in successive waves and produce ammoniacal odour on Nutrient agar. *Pseudomonas aeruginosa*
 - (b) Form jet black with metallic sheen colonies on Wilson and Blair bismuth sulphite agar;
 - (c) Form fried egg colonies on Nutrient agar;
 - (d) Show satellitism phenomenon when grown on Blood agar with *Staphylococcus aureus*. (4 marks)

SECTION B (60 marks)

Answer any **THREE** questions from this section.

11. (a) State three objectives of antimicrobial sensitivity testing. (6 marks)
 (b) Describing characteristics of *Treponema pallidum*. (8 marks)
 (c) Explain the reaction of the following organisms on Triple Sugar Iron (TSI) medium:
 (i) *Shigella* species; (3 marks)
 (ii) *Salmonella typhi*. (3 marks)
12. Describe Fluorescence - denitrification technique for identification of *Pseudomonas* with respect to:
 (a) Principle; (4 marks)
 (b) Procedure; (7 marks)
 (c) Expected results and interpretation; (6 marks)
 (d) Three controls. (3 marks)
13. (a) Distinguish between *Neisseria gonorrhoea* and *Neisseria meningitidis* based on features listed in table I.

Table I

	Feature	<i>N. gonorrhoea</i>	<i>N. meningitidis</i>
(i)	Site of infection		
(ii)	Route of infection		
(iii)	Disease caused		
(iv)	Specimen of choice		
(v)	Sugar fermented		

- (b) Use diagrams to distinguish between the following colonial morphologies:
 (i) Filamentous and rhizoid form; (2 marks)
 (ii) Convex and umbonate elevation; (2 marks)
 (iii) Lobate and curled margins. (2 marks)
- (c) Outline the procedure for Urease test. (4 marks)

Handwritten notes and diagrams:
 - "ammonia and urea" (written vertically)
 - "Urea + H₂O → NH₃ + CO₂"
 - "ammonia + CO₂ → urea"
 - "acidic" (written near the reaction)
 - "3" (written near the reaction)
 - "ammonia and urea" (written horizontally)
 - "CO₂ ammonia and O₂ to red in colour" (written horizontally)
 - "four" (written at the bottom left)

14. (a) Describe Veal infusion broth transport medium for viral specimens with respect to:
- (i) Composition; (3 marks)
 - (ii) Preparation; (6 marks)
 - (iii) Storage. (2 marks)
- Chick Martin (b) Outline any five characteristics used in classification of bacteria. (5 marks)
- (c) List four test used in determination of disinfectant working efficiency. (4 marks)
15. Discuss Multiple tube technique for estimation of most probable number of *Escherichia coli* in water sample with respect to:
- (a) Procedure; (10 marks)
 - (b) Expected results; (4 marks)
 - (c) Interpret results. (6 marks)

THIS IS THE LAST PRINTED PAGE.

14 C Chick Martin
 In use test
 Disinfectant use efficient
 Capacity use

6 Break down beta lactamase ring.