



**THE KENYA POLYTECHNIC UNIVERSITY
COLLEGE**

SCHOOL OF HEALTH SCIENCES AND TECHNOLOGY

**DEPARTMENT OF BIOMEDICAL LABORATORY SCIENCES AND
TECHNOLOGY**

DIPLOMA IN MEDICAL LABORATORY SCIENCES

END OF YEAR 1 EXAMINATION

MEDICAL MICROBIOLOGY

TIME: 3 HOURS

INSTRUCTIONS

This paper consists of TWO SECTIONS: A and B.

Answer ALL questions in SECTION A and B.

Circle the letters of ALL correct answers in each multiple choices questions

Any wrong answer for multiple choices will be penalized (0.5 marks)

SECTION A (40 MARKS)

1. Which of the following is used as a counter-stain in Z-N technique?
 - a) Malachite green
 - b) Crystal violet
 - c) Neutral red
 - d) Carbol fuchsin
2. Which of the following bacteria is Gram positive?
 - a) *Escherichia coli*
 - b) *Klebsiella pneumonia*
 - c) *Salmonella typhi*
 - d) *Bacillus anthracis*
3. To differentiate between Staphylococci and Streptococci the test used is:
 - a) Coagulase test
 - b) Catalase test
 - c) Oxidase test
 - d) urease test
4. All bacteria that inhabit the human body are:
 - a) Phototrophs
 - b) Autotrophs
 - c) Heterotrophs
 - d) chemolithotrophs
5. Biological control used in an autoclave is:
 - a) *Bacillus cereus*
 - b) *Clostridium perfringens*
 - c) *Clostridium histolyticum*
 - d) *Bacillus stearothermophilus*
6. MacConkey medium is an example of:
 - a) Basic medium
 - b) Selective medium
 - c) Differential medium
 - d) Transport medium
7. The period of rapid multiplication of bacteria in a culture medium is known as:
 - (a) Lag phase
 - (b) Log(exponential) phase
 - (c) Stationery phase
 - (d) Decline phase
8. Bacteria which grow at a pH 8.4 and above are known as:
 - a) Basophilic

- b) Psychrophile
- c) Aciduric
- d) Halophiles

9. Destruction or inhibition of microorganisms in living tissues is known as?

- a) Disinfection
- b) Sanitation
- c) Sterilization
- d) Antisepsis

10. Steaming is a method of sterilization achieved by:

- a) Dry heat above 100°C.
- b) Boiling at 100°C for 30minutes.
- c) Moist heat at 121 °C for 30 minutes.
- d) Dry heat at 160°C for 2 hours

11. Organisms that grow at 25° C and below are called:

- a) Mesophiles
- b) Thermophiles
- c) Psychrophiles
- d) Halophiles

12. Under normal circumstances, which of the following specimens are expected to be sterile:

- a) High vaginal swab
- b) Blood
- c) Sputum
- d) Urine

13. Exposure of material to steam at 100°C for 20 minutes on three consecutive days is known as:

- a) Autoclaving
- b) Pasteurization
- c) Steaming
- d) Tyndallization

14. Filtration method can be used for sterilization of:

- a) Plastic syringes
- b) Laboratory coats
- c) Culture media
- d) Plasma

15. Incineration is an efficient method for:

- (a) Destroying contaminated materials
- (b) Sterilizing points of forceps
- (c) Sterilizing scapel blades and needles
- (d) Sterilizing all glass syringes.

16. Which of the following bacteria is cell wall deficient?

- (a) Mycoplasma
- (b) Treponema
- (c) Staphylococcus
- (d) Klebsiella

17. Peptidoglycan is a major constituent of cell wall of:
- Gram positive bacteria
 - Gram negative bacteria
 - Fungi
 - Protozoa
18. Selenite F broth medium is an example of:
- Basic medium
 - Selective medium
 - Differential medium
 - Enrichment medium
19. The main purpose for sporulation in bacteria is:
- reproduction.
 - synthesis of new proteins.
 - protection against phagocytosis.
 - survival in adverse conditions.
20. Which chemical reagent is used for liquefying thick sputum sample for detection of *Mycobacterium* species?
- 10% KOH.
 - 1% Trypsin.
 - Sodium citrate.
 - 3% Hydrogen peroxide.
21. Which is (are) the most likely pathogen(s) to be found in stool samples ?:
- Escherichia coli*
 - Streptococcus pyogenes*
 - Salmonella typhi*
 - Streptococcus agalactiae*
22. Which of the following bacteria is involved in the production of catalase enzyme ?
- Streptococcus pneumoniae*
 - Staphylococcus aureus*
 - Streptococcus viridans*
 - Streptococcus agalactiae*
23. Who introduced the method of vaccination to prevent smallpox?
- Louis Pasteur
 - Edward Jenner
 - Paul Ehrlich
 - John Hunter
24. Organisms that grow above 45° C are called:
- Mesophiles
 - Thermophiles
 - Psychrophiles
 - Halophiles
25. Bacteria which grow at a pH 4.0 and below are known as:
- Basophilic
 - Psychrophile

- c) Aciduric
 - d) Halophiles
26. Which of the following is used as a counter-stain in Gram stain technique?
- a) Malachite green
 - b) Crystal violet
 - c) Neutral red
 - d) Methylene blue
27. One of the following is not a counterstain in Gram stain:
- (a) Malachite green
 - (b) Neutral red
 - (c) Safranin
 - (d) Basic fuchsin
28. Red heat is used for sterilization of
- (a) Glass slides
 - (b) Inoculating wire
 - (c) Laboratory coats
 - (d) Culture media
29. Common pilus in bacteria is used for?
- (a) Locomotion
 - (b) Attachment
 - (c) Reproduction
 - (d) Exchange of genetic materials
30. What medium would you use to isolate *Corynebacterium diphtheria* from a throat swab?
- a) Chocolate agar
 - b) Blood tellurite agar
 - c) Lowenstein –Jensen medium
 - d) Bordet-Gengou medium
31. Under normal circumstances, which of the following specimens are expected to be non-sterile:
- a) High vaginal swab
 - b) Blood
 - c) CSF
 - d) Bonemarrow
32. Heating in a hot air oven at 160⁰C for one hour is used for sterilization of:
- a) Culture media
 - b) Oils
 - c) Glass syringes
 - d) Carbohydrates
33. The following is not true on fungi:
- a) Fungi can occur as yeasts, molds, or as a combination of both forms
 - b) Hyphae can be sparsely septate to regularly septate and possess a variable number of nuclei.
 - c) digest their food externally by releasing hydrolytic enzymes into their immediate surroundings
 - d) Deuteromycetes are Fungi perfecti

34. Which one of the following is not a yeast:
- a) *Rhodotorula sp*
 - b) *Saccharomyces cerviciae*
 - c) *Laboa laboi*
 - d) *Trichophyton mentagrophytes*
34. Opportunistic mycoses include the following except:
- a) Candidiasis
 - b) Dermatormycosis
 - c) Cryptococcosis
 - d) Aspergillosis
35. "Jock itch" is the infection of the :
- a) Nails.
 - b) Bearded areas of the face and neck
 - c) Groin, perineum or perianal area.
 - d) Toe webs and soles of feet.
36. Systemic (deep) mycoses consist of the following
- a) Blastomycosis
 - b) Lobomycosis
 - c) Mycetoma
 - d) Occulomycosis
37. *The following belong to zygomycetes sub-division:*
- a) Rhizomucor
 - b) *Filobasidiella*
 - c) Schizophyllum
 - d) *Piedraia hortae*
38. *Reproduction of yeast is through:*
- a) *Binary fussion*
 - b) *Budding off*
 - c) Asexual propagules through conidia and spore
 - d) formation of endogenous ascospores,
39. *The following are Superficial mycoses:*
- a) Dermatophytosis
 - b) Dermatormycosis
 - c) Tinea versicolor
 - d) Sporotrichosis

SECTION B (60 MARKS)

41. Outline the following methods for staining bacteria:
- a) Ziehl-Neelsen (ZN) method (10 marks)
 - b) Gram stain method. (10 marks)
42. a) Draw a labeled diagram of a bacterial cell. (10 marks)
- b) Draw the following types of spore:
- i) Oval non-bulging terminal spore. (2 marks)
 - ii) Round bulging central spore. (2 marks)
 - iii) Spherical bulging subterminal spore. (2 marks)
 - iv) Round non-bulging terminal spore. (2 marks)
 - v) Oval bulging central spore. (2 marks)
43. (a) Indicate various Tinea "ringworm" and part of the body they affect. (12 marks)
- (b) Define dermatophyte, and describe their different natural sources and modes of transmission. (8 marks)