DATE: 18 November 1996

TIME ALLOWED: Perusal - 10 minutes
Writing - 3 hours

INSTRUCTIONS: Remember to write your name on the answer books before attempting any questions.
Attempt all questions.
Allocate your time wisely in relation to the number of marks assigned for each question and time available.

Before leaving, ensure that your NAME, STUDENT NUMBER AND SCHOOL are on each book used and hand them to the Supervisors.
Question 1. Answer any one (1) from the following three (3) questions. 

(1 x 40 marks)

a) List the methods used to control microbial contamination in hospitals and food industries. Discuss two (2) methods in detail.

b) State how the Gram positive bacteria of medical and industrial importance are classified. Discuss members of the genus Bacillus and Clostridium providing details of their importance.

c) Legionella pneumophila, Chlamydia, Rickettsia and viruses are all intracellular parasites. However the degree of parasitism differs. Comment on the nature of these parasites that is important in this phenomenon.

Question 2. Write notes on any five (5) of the following. Illustrate with diagrams wherever possible. 

(5 x 8 marks)

a) Koch’s postulates
b) Archaeal cell membranes
c) Bacterial flagella
d) Spirochetes
e) Salmonella
f) Morphological diversity in Bacteria
g) Industrially important bacteria

Question 3. Answer ALL questions. Write your answers in the book provided. 

(5 x 2 marks)

a) Answer the following questions in one or two sentences

(i) If Clostridium tetani is relatively sensitive to penicillin why doesn’t penicillin cure tetanus?

(ii) Give an example of the normal flora of a human intestine.

(iii) How do animal viruses escape the infected cells?

(iv) Distinguish between a temperate and lytic bacteriophage

(v) Define a heterotroph and a lithotroph

b) Answer ALL the following multiple choice questions. Write only the correct alphabet letters against the question number in your answer books.

(15 x 2 marks)

1. To isolate Salmonella from a food sample one would first use

   1) centrifugation
   2) differential media
   3) enrichment culture
   4) filtration
   5) serology

2. The first step in the identification of pathogen would be the:

   1) determination of its antibiotic sensitivity
   2) gram stain
   3) inoculation of an experimental animal to show the bacterium causes a disease
   4) isolation of a pure culture of the pathogen
   5) use of the appropriate diagnostic table.
3. The ______________ do not possess a nuclear membrane

1) algae
2) bacteria
3) eucaryotes
4) fungi
5) protozoa

4. Mycolic acids are characteristically found in the cell walls of:

1. Bacillus
2. Mycobacterium
3. Mycoplasma
4. Streptococcus
5. Treponema

5. Bacterial fimbriae and pili function primarily in

1. attachment
2. motility
3. nutrient uptake
4. protection against cell lysis
5. protection against phagocytosis.

6. Which of the following is found in eukaryotic organisms and not in prokaryotic organisms?

1. mitochondrion
2. photosynthetic pigments
3. DNA
4. ribosomes.

7. High concentration of dipicolinic acid is unique to what bacterial structure?

1. DNA of nucleoid
2. RNA of ribosomes
3. cortex of endospore
4. peptidoglycan of cell wall

8. What is PPD?

1. Pastuerell pestis-type D cell wall fraction, which is used to immunize against plague
2. polyvalent pneumonia derivative, which protects against the most common types of streptococcal pneumonias
3. purified protein derivative, which is used for the tuberculin skin test
4. polycystic pharyngitis diphtheria, which is one of the complications of untreated diphtheria

9. Which of the following would be suspected in a family who drank water straight from their farm pond and who showed symptoms of chills, fever, muscular pain, skin rash and jaundice?

1. bubonic plague;
2. leptospirosis;
3. typhus
4. Rocky Mountain spotted fever.
10. Which of the following pathogens has an animal as its main reservoir?
1. diphtheria
2. polio
3. gonorrhoea
4. tetanus
5. rabies.

11. The ________________ are obligate intracellular parasites
1. Bacillus
2. Chlamydia
3. Clostridium
4. Mycobacterium
5. Mycoplasma

12. A genus of bacteria characterized by the absence of a cell wall is
1. Bacillus
2. Mycobacterium
3. Mycoplasma
4. Streptococcus
5. Treponema.

13. Bacterial endotoxins:
1. are lipopolysaccharides
2. induce fever
3. are components of the cell wall of gram-negative bacteria
4. all the above (1, 2 and 3) are true
5. both 2 and 3 are true.

14. Influenza viruses attach to their host cells by means of
1. fimbriae
2. hemagglutinin spikes
3. neuraminidase spikes
4. M protein
5. dextran.

15. “Typhoid Mary” Mallon, who appeared to be a healthy individual, actually was chronically infected with Salmonella typhi and served to transmit this pathogen to many people over a period of several years. Mary Mallon is an example of a(n)
1. vector
2. carrier
3. reservoir
4. etiologic agent
5. formite

Question 4. Answer any two (2) from the following three (3) questions: (2 x 20 marks)

a) i) What is specialized transduction?
   ii) How is it different to generalized transduction?

b) i) Why are viruses classified as obligatory intracellular parasites?
   ii) Name one (1) DNA containing virus and one (1) RNA containing virus
   iii) Describe the methods used for cultivating viruses.

c) List the four (4) properties that define a virus and discuss these properties.