INDEX NUMBER:

SECTION A

Answer as many questions as you can. Please write the correct answer in the space provided OR circle the correct alternative.

1. Which of the following would be found growing in a Petri plate?

   a. An aerobe
   b. **Colony on an agar surface**
   c. Viruses on an agar surface
   d. Barophiles

2. Which of the following terms best describes an organism that cannot exist the presence of oxygen?

   a. Obligate aerobe
   b. Facultative aerobe
   c. Obligate anaerobe
   d. Facultative anaerobe

3. The statement, "in the laboratory, a sterile inoculating loop is moved across the agar surface in a culture dish, thinning a sample and isolating individuals" describes which of the following

   a. Broth culture
   b. Pour pate
   c. Streak plate
   d. Dilution plate

4. A plasmid is

   a. A molecule of RNA found in bacterial cells
   b. Distinguished from a chromosome by being circular
   c. A structure in bacterial cells formed from plasma membrane
   d. Extrachromosomal DNA

5. Which of the followings are called jumping genes

a. Hfr cells
b. Transducing phages
c. Palindromic sequences
d. Transposona

6. List FOUR predisposing factors to the development of diseases

7. List THREE factors that can lead to an outbreak of food poisoning on KNUST campus.

8. Diffusion and dilution tests that expose pathogens to antimicrobials are designed to

a. Determine the spectrum of action of a drug
b. Determine which drug is effective against a particular pathogen
c. Determine the amount of a drug to use against a particular pathogen
d. Both b and c

9. The key to successful chemotherapy is

a. Selective toxicity
b. The diffusion test
c. The minimum inhibitory concentration test

10. Which of the following is closely associated with the β–lactam ring

a. Penicillin
b. Vancomycin
c. Bacitracin
d. Isoniazid

11. Drugs that act against protein synthesis include

a. Beta-lactams
b. Trimethoprim
c. Polymyxin

d. Aminoglycosides

12. The most frequent portal of entry for pathogens is

a. The respiratory tract
b. The skin
c. The conjunctiva
d. A cut or wound

Multiple choice questions in Microbiology and infection

1. Triple vaccine for the prevention of virus infections protects against

a. Mumps virus
b. Coxsackie virus
c. Measles virus
d. Rubella virus
e. Adenoviruses

2. Advantages of sterilization by ionizing radiation include

a. Short sterilization time
b. Reliability of sterilization
c. Negligible rise in temperature
d. Ability to sterilize equipment made of heat sensitive materials e.g. polystyrene
e. No deleterious effects on glassware or textile fibres

3. Tetanus toxoid

a. Need not to be given for superficial wounds
b. Is given three times to babies as a component of triple vaccine
c. Confers passive immunity
d. Should be avoided in the immunocompromised person
e. Administration within the last five years obviates the need to give antibiotics in a case of tetanus-prone injury

4. Ethylene oxide is commonly used for the sterilization of

a. Fibre-optic endoscope
b. Glassware
c. Therapy that reduces or climates infectivity of the individual
d. Destruction of vectors by spraying with insecticide

5. Enterococcus faecalis is

a. A frequent cause of pyogenic infections
b. A gram negative coccus
c. Usually sensitive to aminoglycosides
d. Often resistant to cephalosporin antibiotics
e. Associated with infection in hip prostheses

6. Methicillin-resistant staphylococcus aureus(MRSA)

a. Is usually sensitive to vancomycin
b. Is more likely to cause deep-seated infection
c. Is often resistant to many antistaphylococcal antibiotics
d. May cause asymptomatic colonization
e. May be phage-typed for epidemiological purposes

7. Aminoglycoside antibiotics such as gentamicin

a. Act on the bacterial cell wall
b. Are active against staphylococci
c. Are effective in the treatment of anaerobic myositis
d. Are contra-indicated in patients with renal impairment
e. May cause loss of visual acuity in the elderly

8. In bacterial endocarditis

a. Blood cultures may be negative
b. Staphylococci are rare causative organisms
c. The inability to control infections with antibiotic therapy is an indication for replacement of the affected valve

d. Combination therapy with a penicillin and an aminoglycoside is advised in most cases

9. Which of the following harbors a pathogen for a long period of time?

a. Casual carrier
b. Acute carrier
c. Transient carrier
d. Chronic carrier
e. All of the above

10. Which zoonotic is contracted by eating insufficiently cooked meat?

a. Trichinosis
b. Anthrax
c. Brucellosis
d. Tularemia

11. Which virulence-enhancing mechanism of a pathogen is considered to be a mobile genetic element?

a. Bacteriophages
b. Plasmids
c. Transposons
d. All of the above
e. None of the above

12. The key factor responsible for the rise in drug resistant pathogens is

a. Antigenic drift
b. Antigenic shift
c. Inappropriate use of antimicrobial therapy
d. Bad hygiene
e. Vaccination

13. Usually, pandemic disease spread among

a. People
b. Animals
c. Insects
d. States
e. Continents

14. Animal diseases that can be transmitted to humans are termed as

a. Epizootiology
b. Enzootic
c. Epizootic
d. Panzootic
e. Zoonosis

15. Which of the following refers to the total number of individuals infected in a population any one time?

a. Morbidity
b. Prevalence rate
c. Mortality rate
d. Epidemic rate
e. Outbreak rate

16. Typhoid Mary spread disease through her

a. Teaching
b. Cleaning
c. Cooking
d. All of the above
e. None of the above

17. Remote sensing can be used to study the distribution, dynamics, and environmental correlates of microbial diseases. It involves which of the following?

a. Blood sampling
b. Questionnaires

c. Physical exams
d. Digital images
e. All of the above

18. The science of epidemiology originated and evolved in response to the great _____ diseases.

a. Bacterial
b. Viral
c. Fungal
d. Parasitic
e. Epidemic

19. Disease is a response to

a. Environmental factors
b. Specific infective agents
c. Inherent defects of the body
d. All of the above
e. None of the above

20. Who was the first epidemiology?

a. Francis Crick
b. Walter Gilbert
c. Fred Sanger
d. John Snow
e. James Watson

21. The classic epidemiological studies carried out in London between 1849 - 1854 were due to _____ outbreak.

a. Small pox
b. Cholera
c. Influenza
d. Typhoid fever
e. Yellow fever

22. Which of the following is ignited to break the connection between the three of the infection and susceptible individuals?

a. Quarantine and isolation of cases and/or carriers
b. Destruction of an animal reservoir of infection
c. Treatment of sewage to reduce water contamination

23._____ snow molds

I. Attack plants even when covered by a layer of snow
II. Can grow at temperatures slightly below 0°C

a. I only is true
b. II only is true
c. Both I and II are true
d. Neither I nor II are true

24._____ The function of mycorrhizae is to

i. Increase the availability of nutrients to plants
ii. Aid in water uptake for plant in arid environments

a. i only is true
b. ii only is true
c. both i and ii are true
d. neither i nor ii are true

25._____ members of the genus Frankia are

i. Capable of nitrogen fixation for trees and shrubs.
ii. Readily cultivated bacteria

a. i only is true
b. ii only is true
c. both i and ii are true
d. neither i nor ii are true

26._____ throughout the world, soils are being imparted by mineral nitrogen releases form

i. Agricultural fertilizer run off
ii. Fossil fuel combustion

a. i only is true
b. ii only is true
c. both i and ii are true
d. neither i nor ii are true

Normal Microbiota and Nonspecific Host Resistance

27. A majority of the microorganism associated with the human body are

a. protozoa
b. bacteria
c. fungi
d. viruses
e. parasites

28. The dynamics of the microorganisms associated with the human ody are most commonly to be all of the following EXCEPT

a. symbiotic
b. mutualistic
c. pathogenic
d. commensalistic
e. none of the above

29. Germfree animals are almost completely resistant to the intestinal protozoan that causes amebic dysentery because of

a. A thin intestinal wall
b. A low antibody titer
c. A lower metabolic rate
d. The absence of bacteria source
e. A reduced cardiac input

30. A pimple contains all BUT the following

a. Sebun
b. Keratin
c. Viruses
d. Bacteria
e. Lipases

31. Which genus of bacterium contributes to plaque caries, gingivitis, and periodontal disease?

a. Streptococcus
b. Staphylococcus
c. Bacillus
d. Escherichia
e. Proteus

32. The stomach usually contains a very low concentration of bacteria due to

a. The neutral pH
b. The high pH
c. The low pH
d. The high turnover rate of contents
e. The inhibitory action of bile

33. I. the amount of nutrients in tropical ecosystems
II. the amount of nutrients bound up in plants and animals in tropical ecosystem

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand is more than one of the above relations to II

34. I. the percentage of vascular plants with mycorrinzae
II. The percentage of vascular plants without mycorrinzae

a. **I is greater than II**
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand is more than one of the above relations to II

35.I. The rate of occurrence of chestnut blight when the pathogenic fungus is not infected with a hypovirus
II. The rate of occurrence of chestnut blight when the pathogenic fungus is infected with a hypovirus.

a. **I is greater than II**
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand is more than one of the above relations to II

36.I. The ability of lignin to be degraded in aerobic environments
II. The ability of lignin to be degraded in anaerobic environments

a. **I is greater than II**
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand is more than one of the above relations to II

For the next 4 items each item list two categories, numbered I and II

37.I – Endophytes
II – Fungi

a. All members of I are also members of II, but not all members of II are members of I.
b. All members of II are also members of I, but not all members of I are members of II
c. All members of I are members of II and all members II are members of I
d. No member of I is also member of II
e. **Some members of I are members of II and some are not, and members of II are members of I and some are not**

38.I – bacteria
II – endophytes

a. All members of I are also members of II, but not all members of II are members of I.
b. All members of II are also members of I, but not all members of I are members of II
c. All members of I are members of II and all members II are members of I
d. No member of I is also member of II
e. Some members of I are members of II and some are not, and members of II are members of I and some are not

39.I – ectomycorrhizae
II – bacteria

a. All members of I are also members of II, but not all members of II are members of I.
b. All members of II are also members of I, but not all members of I are members of II
c. All members of I are members of II and all members II are members of I
d. No member of I is also member of II
e. Some members of I are members of II and some are not, and members of II are members of I and some are not

40.I – zygomycete fungi
II – endomycorrhizae

a. All members of I are also members of II, but not all members of II are members of I.
b. All members of II are also members of I, but not all members of I are members of II
c. All members of I are members of II and all members II are members of I
d. No member of I is also member of II

e. **Some members of I are members of II and some are not, and members of II are members of I and some are not**

41. Hypomycete fungi:
I – grow in leaves in aquatic environments and produce nonmotile tetradiate conidia.
II – growing in leaves in aquatic environments. These infected leaves are the referred food source for some aquatic insects.

a. I only is true
b. II only is true
c. **Both I and II are true**
d. Neither I nor II are true

42. Coliforms are used as indicator organisms because:
I – they are present wherever enteric pathogens are present.
I – a testing procedure with great specificity is easy to perform.

a. I only is true
b. II only is true
c. **Both I and II are true**
d. Neither I nor II are true

Microorganisms in Terrestrial Environments

43. In relation to bacterium's optimal growth requirements, which group would you expect to be MOST likely involved in decomposition of compost piles?

a. Acidophiles
b. Psychrophiles
c. Extreme halophiles
d. Mesophiles
e. **Thermophiles**

44. Because the soil primarily is an _____ environment; the elements, such as carbon, nitrogen, sulfer and iron, will turn to be in the _____ state

in the soil.

a. **Aerobic; oxidized**
b. Aerobic; reduced
c. Anaerobic; oxidized
d. Anaerobic; reduced

45. A microbial community that develops in puddles in low areas and retained on the soil surface is called a

a. Zooglea
b. Desert crust
c. Mychorrhizae
d. Microfilm
e. Rhizosphere

46. Nodulation and the development of an anaerobic environment to facilitate nitrogen fixation characteristic of which genus?

a. Agrobacterium
b. Escherichia
c. Pseudomonas
d. Cryphanectria
e. Rhizobium

47. The nitrogen-fixation form of the rhizobium bacterium is called a

a. Bacteroid
b. Symbiosome
c. Infection thread
d. T-plasmid
e. Mycorrhizae

48. Which of the following genera possess a tumor including plasmid?

a. Rhizobium
b. **Agrobacterium**

c. Frankia
d. Pseudomonas
e. Erwinia

49. When it induces a tumor in plants, Agrobacterium introduces _____ into the DNA of the plant cell.

a. mRNA
b. Ti plasmid
c. cDNA
d. T-DNA
e. Induction factor

50. Nitrogen fertilizers disrupt ecosystem structure and function by

a. Promoting heterotrophic growth causing an imbalance in CO_2 levels.
b. Decreasing filamentous fungal development which causes loss of soil crumb structure and subsequent soil fertility.
c. Causing more antibiotic producing bacteria to grow and produce antibiotics which stunt the growth of plants.
d. Reducing the number of nitrogen fixing bacteria in soils.
e. Causing formation of nitrosamine carcinogens.

51. Addition of nitrogen-containing fertilizers effects gas exchange processes in the soil

a. Resulting in release of NO and N_2O which are greenhouse gasses.
b. Causing methane gas to be consumed
c. Causing methane gas to be produced
d. Causing antibiotic production in bacteria leads to antibiotic resistance
e. Assimilation of NO_3 by the plants

52. Methanotrophic bacteria

a. Oxidize methane gas
b. Produce methane gas
c. Utilize methane as the electron source for reduction processes.

d. Are responsible for the greenhouse effect
e. Are most active in anaerobic environments

53. Which of the following genera of fungi produces a black slime that dries out to produce a dusty layer of fungal spores and is implicate in sick building diagnosis

a. Mycobacterium
b. Agaricus
c. Stachybotrys
d. Puccinia
e. Penicillium

For the next set of questions, compare the entities I and II

54. I – the rate of flux of oxygen in air
II – the rate of flux of oxygen in water

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

55. I – the concentration of CO_2 in air
II – the concentration of CO_2 in soil atmospheric spaces

e. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

56. I – the percentage of microorganisms in soil that have been cultivated.
II – the percentage of microorganisms in soil that have not been cultivated.

a. I is greater than II
b. II is greater than I

c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

57. I - Loss of carbon through the microbial loop in oligotrophic environments
II - loss of carbon through the microbial loop in copiotrophic environments.

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

58. I - The amount of oxygen dissolved in hypolimnion water in the winter
II – the amount of oxygen dissolved in hypolimnion water in the summer

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

59. I – The BOD of wastewater after the tertiary stage in treatment
II – the BOD of wastewater after the primary stage in treatment

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

For the next set of questions, each question lists two categories, numbered I and II

60. I – ultramicrobacteria
II – Algae

a. All members of I are also members of II, but not all members of II

are members of I.

b. All members of II are also members of I, but not all members of I are members of II
c. All members of I are members of II and all members II are members of I
d. **No member of I is also member of II**
e. Some members of I are members of II and some are not, and members of II are members of I and some are not

61.I – hyphomycetes
II – fungi

a. All members of I are also members of II, but not all members of II are members of I.
b. All members of II are also members of I, but not all members of I are members of II
c. All members of I are members of II and all members II are members of I
d. No member of I is also member of II
e. Some members of I are members of II and some are not, and members of II are members of I and some are not

For the next set of questions, compare the validity of the two statements.

62.I – anoxic zones of aquatic environments developed oxygen can be used by aerobic microbes faster than it can be replenished.
II – anoxic zones of aquatic environments developed oxygen diffuses slowly in aquatic environments

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

63.I – a winogradsky column is used to filter microorganisms from a water sample taken from a deep black smoker.

II – a winogradsky column is used to demonstrate interactions and gradients that occur in aquatic environments.

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

64. I – the rate of flux of oxygen in air
II – the rate of flux of oxygen in water

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

65. I – the solubility of oxygen at 25°C
II – the solubility of oxygen at 15°C

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

66. I – ultramicrobacteria or nanobacteria are the dominant bacteria in marine systems.
II – ultramicrobacteria or nanobacteria are so numerous that they are a major food source for heterotrophic flagellates

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

Answer these next questions normally (just choose the best answer)

67._____ is an environment like _____ where microorganisms are functioning in an extremely thin film of water and where oxygen-containing air is close to them.

a. Low oxygen diffusion environment; soils
b. High oxygen diffusion environment; soils
c. Low oxygen diffusion environment; lakes
d. High oxygen diffusion environment; lakes

68. Members of all the following genera of bacteria typically are found in a maturing Winogradsky column except

a. Clostridium
b. Rhodospirillum
c. Chlorobium
d. Desulfovibrio
e. Escherichia

69. The red field ratio is an index of concentration of

a. Carbon, hydrogen and oxygen
b. Nitrogen, potassium and iron
c. Carbon, nitrogen, and sulfur
d. Carbon, phosphorus and sulfur

70. Fecal coliforms differs from coliforms by virtue of

a. The ability of coliforms to ferment lactose within 48hours and coliforms cannot.
b. Fact that fecal coliforms are Gram positive rods and coliforms are Gram negative rods.
c. Are derived from warm blooded animals and can grow at 44.5 °C.
d. Fact that fecal coliforms are facultatively anaerobic whereas coliforms are obligate anaerobes.

71. Because it can be used with a variety of media and allow a resuscitation step the _____ technique has become the common and often preferred

method of evaluating the microbiological characteristics of water.

a. Most probable number
b. P-A
c. MUG
d. Membrane filtration
e. Winogradsky

72. Which of the following statements is the best definition of a pandemic disease

a. It normally occurs in a given geographic area
b. It is a disease that occurs more frequently than usual for a geographic area or group of people
c. It occurs infrequently at no predictable time scattered over a large area or population
d. It is an epidemic that occurs on more than one continent at the same time

73. Consider the following case. An animal was infected with a virus. A mosquito bit the animal, was contaminated, the virus and proceeded to bite and infect a person. Which was the vector?

a. Animal
b. Virus
c. Mosquito
d. Person

74. A patient contracted athlete's foot after a long-term use of a medication. His physician explained that the malady was directly related to the medication. Such infections are termed

a. Nosocomial infections
b. Exogenous infections
c. Iatrogenic infections
d. Endogenous infections

75. Which of the following phrases describes a contagious disease

a. A disease arising from a fomite
b. A disease that is easily passed from host in aerosols
c. A disease that arises from opportunistic normal microbiota
d. Both a and b

76. The process by which microorganisms attach themselves to cells is

a. Infection
b. Contamination
c. Disease
d. Adhesion

77. When pathogenic bacterial cells lose the ability to make adhesion they

a. Become a virulent
b. Produce endotoxin
c. Absorb endotoxin
d. Increase in virulence

78. Which of the following are most likely to cause a disease

a. Opportunistic pathogens in a weakened host
b. Pathogens lacking the enzyme kinase
c. Pathogens lacking the enzyme collagenase
d. Highly virulent organisms

79. The nature of bacteria capsules

a. Causes widespread blood clotting
b. Allows phagocytes to readily engulf these bacteria
c. Affects the virulence of these bacteria
d. Has no effect on the virulence of bacteria

80. Just as pathogens have preferred portals of entry into the human host, they also have definitive portals of exit. Name three portals of exit.

81. A parasite that causes a disease is called a Vector

82. Draw a schematic labeled flow chart of the entry of a pathogen into host cells.

83. If pasteurization does not achieve sterilization, why is food treated by pasteurization?

To get rid of pathogens only.
This is to kill pathogenic bactena to make food safe to eat. It helps reduce the transmission of diseases such as typhoid fever.

84. The antimicrobial effect of germinal radiation is due to The production of free reactants which damage DNA, RNA and cell membrane of the microbes.

85. The antimicrobial effect of ultraviolet radiation is due to

86. Differentiate between an antiseptic and a disinfectant.

Antiseptic	disinfectant
Applied to the body	Applied to the non-living surfaces.
Contains lower concentration of biocides	contains higher concentration of biocides

87. List three factors influencing heat sterilization.

- Temperature - PH - relative humidity

88. List three types of filters used extensively in the science of microbiology.

- membrane filters
- seitz filters
- Candle filters

89. Pasteurized milk is not sterile. True or False

90. The advantage of UV radiation disinfection is that it readily penetrates through most samples. True or False

91. Less than 1% of microorganisms are harmful and cause disease. True or False

92. The study of the cause of a disease is ...Pathology.....

93. The study of where and when diseases occur and how they are transmitted within populations is
Epidemiology.....

94. Diseases that are naturally spread from their usual animal hosts to

humans are called
.....Zoonotic diseases.....

95. A nonliving reservoir of disease such as a toothbrush, drinking glass, or needle, is called
.....Fomite.....

96. .....Nosocomial..... infections are those acquired by patients and staff while in health care facilities.

97. What do Hyalurodinase, Collagenase, Streptokinase and Coagulase have in common

98. Name four bacterial diseases of man transmitted from person to person by inhaled airborne particles.

Tuberculosis - Mycobacterium tuberculosis
Whooping cough - Bordetella pety
Diptheria - Corynebacterium diptheria
Pneumonia - Mycoplasma pneumoniae

99. Match the following types of antimicrobials within their action: write the correct letters against the correct/best match.

Bacteriostatic	a. Kills microbes
Germicidal	b. Inactivates viruses
Viricidal	c. Kills bacteria
Sporicidal	d. Stops bacterial growth
Fungicidal	e. Kills bacterial endospores and fungal spores
Bacteriocidal	f. Kills yeasts and molds

ANSWER ALL QUESTIONS

1. Gamma rays and X rays are effective in killing microorganisms because they

   a. Dislodge electrons from atoms, creating ions
   b. Damage DNA
   c. Produce powerful oxidizing agents (peroxides)
   d. All of these
   e. None of these

2. Heat sensitivity (rubber and plastics) and bulky materials (mattresses) can be sterilized using

   a. Dry heat
   b. Autoclaving
   c. UV radiation
   d. Gaseous ethylene oxide
   e. None of these

3. Mucous secreting membranes are found in the

   a. Urinary system
   b. Digestive system
   c. Respiratory passages
   d. All of the above

4. All the following are true about releasing untreated sewage into river except

   a. It is a health hazard
   b. It increases the BOD
   c. It decreases the dissolved oxygen

d. It kills bacteria

Match the types of wastewater treatment listed in the following questions with the following processes. Choices may be used once, more than once, or not at all.

5. Removal of solids

   a. Primary treatment
   b. Second treatment
   c. Tertiary treatment
   d. None of these

6. Activated sludge

   a. Primary treatment
   b. Second treatment
   c. Tertiary treatment
   d. None of these

7. Chemical precipitation of phosphorus

   a. Primary treatment
   b. Second treatment
   c. Tertiary treatment
   d. None of these

8. Trickling filter

   a. Primary treatment
   b. Second treatment
   c. Tertiary treatment
   d. None of these

9. I – The use of manganese in magnetosomes by magneto-aerotactic bacteria
   II – the use iron in magnetosomes y magneto-aerotactic bacteria

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

10. The Mad Hatter of Lewis Carroll's Alice in Wonderland and the people surrounding Japan's Minamata Bay are linked by toxicity to which element?

a. Manganese
b. Mangnesium
c. Mercury
d. Molybdenum
e. Iron

For the next set of questions, compare the validity of two statements.

11. Ruminant organisms include:
I – obligate aerobes
II – anaerobic fungi

a. I only is true
b. II only is true
c. Both I and II are true
d. Neither I nor II are true

12. Predatory bacteria
I – do not exist because bacteria are too small
II – have to be larger than their prey

a. I only is true
b. II only is true
c. Both I and II are true
d. Neither I nor II are true

13. Examples of predatory organisms include
I – bacteria
II – fungi

a. I only is true
b. II only is true
c. Both I and II are true
d. Neither I nor II are true

14. Microorganisms play a significant role in cycling nutrients in the
I – sulfur cycle
II – iron cycle

a. I only is true
b. II only is true
c. Both I and II are true
d. Neither I nor II are true

15. The amount of mercury per gram of tissue in Japan Minamata Bay in
I – phytoplanktonic organisms
II – herbivorous organisms

a. I only is true
b. II only is true
c. Both I and II are true
d. Neither I nor II are true

For the next items, each item lists two categories numbered I and II.

16. I – parasitic organisms
II – bacteria

a. All members of I are also members of II, but not all members of II are members of I.
b. All members of II are also members of I, but not all members of I are members of II
c. All members of I are members of II and all members II are members of I
d. No member of I is also member of II
e. Some members of I are members of II and some are not, and

members of II are members of I and some are not

17. I – nitrogen fixing organisms
    II – symbiotic bacteria

    a. All members of I are also members of II, but not all members of II are members of I.
    b. All members of II are also members of I, but not all members of I are members of II
    c. All members of I are members of II and all members II are members of I
    d. No member of I is also member of II
    e. Some members of I are members of II and some are not, and members of II are members of I and some are not

18. Which of the following is/are examples of protocooperation?

    a. Desulfovibrio and chromatium
    b. The Pompeii worm and sulfur-oxidizing bacteria
    c. Shrimp Rimicaris exocalata and filamentous sulfur-oxidizing bacteria
    d. Nematode Eubostrichus parasitiferus and sulfur-oxidizing bacteria
    e. All the above are examples of protocooperation.

19. An association in which one population of organisms benefits while the other is neither harmed nor helped is called a(an) _____ association.

    a. Parasitic
    b. Protocooperative
    c. Commensalistic
    d. Symbiotic
    e. Mutualistic

20. Nitrosomonas and Nitrobacter interactions in the nitrogen cycle where Nitrosomonas oxidizes ammonium ions to nitrite and Nitrobacter oxidizes nitrite to nitrite is an example of

a. Parasitism
b. Protocooperation
c. Commensalism
d. Syntrophism
e. Mutualism

21. Which of the following associations is characterized by some degree of coexistence whereby one organism benefits at the expense of the other?

a. Predation
b. Protocooperation
c. Commensalism
d. Parasitism
e. Mutualism

22. _____ describes the negative effect that one organism has on another organism because of release of a specific compound that detrimentally effects the second organism.

a. Amensalism
b. Protocooperation
c. Commensalism
d. Parasitism
e. Mutualism

23. In leaf cutter ant colonies a streptomycete bacterium produces an antibiotic that controls Escovopis, persistent parasitic fungus that can destroy the ants fungal garden. This is an example of

a. Mutualism
b. Syntrophism
c. Commensalism
d. Amensalism
e. Protocooperation

24. _____ is the process in which organic matter decomposed to release simpler inorganic compounds.

a. Ammonification
b. Nitrogen fixation
c. Mineralization
d. Immobilization
e. Nitrification

For the next set of questions compare the entities I and II and use the following key to characterize their relationship

25. I – the amount of energy required for ammonia-oxidization to nitrite
II – the amount of energy required for nitrogen fixation

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

26. I – the amount of reduction potential required for nitrite assimilation
II – the amount of reduction potential required for nitrification

a. I is greater than II
b. II is greater than I
c. I is exactly or approximately equal to II
d. I may stand in more than one of the above relations to II

Microorganism interactions and microbial ecology

27. Which of the following statements is true?

a. Symbiosis refers to different organisms living together.
b. Members of a symbiotic relationship cannot live without each other.
c. Symbiosis refers to different organisms living together and benefiting from each other.
d. A parasite is not in a symbiosis with its host.

28. The reservoir for nitrogen is

a. The atmosphere
b. Rocks
c. Ammonia
d. Nitrites
e. Amino acids

29. Higher plants most often absorb nitrogen from the soil in the form

a. N2
b. Nitrites
c. Ammonia
d. Nitrates
e. Amino acids

30. All of the following are examples of negative symbiosis except

a. Amensalism
b. Competition
c. Predation
d. Commensalism
e. Parasitism

31. In its broadest sense _____ is the association of two or more species of organisms.

a. Symbiosis
b. Populations
c. Mutualism
d. Parasitism
e. Organogenesis

32. An obligatory association between two different species that is beneficial to both populations of organisms is

a. Parasitic

b. Protocooperative
c. Predatory
d. Symiotic

33. The functions of ruminant organisms is to

a. Digest cellulosic materials into organic acids which can be used as energy sources
b. Construct cellulose from organic acids and use the cellulose as an energy source
c. Produce methane gas and increase global warming
d. Reduce carbon to H_2O and CO_2
e. None of the above

34. Interspecies hydrogen transfer as occurs between methanospirilum and syntrophobacter is an example of

a. Competition
b. Syntrophism
c. Oxidation
d. Fixation
e. Carboxylation

35. Of all the fungi that cause disease in compromised hosts, none are as widely distributed as which of the following species?

a. Aspergillus
b. Candida
c. Pneumocystis
d. Blastomyces
e. Coccidioses

36. What is true of the pathogenic entomoeba E., histolytica, but not the nonpathogenic strain E dispar?

a. Cyst production
b. Encystation
c. Trophozoite production

d. Production of cysteine proteinase
e. Metacusts

37. Which of the following is not true ***cryptosporidium?***

a. Caused the largest outbreak of waterborne illness in US history
b. A common intestinal parasite of many birds and animals
c. Encystation occurs within the small intestine
d. Extremely sensitive to disinfectants such as chlorine
e. Not easily removed by the sand filters used to produce drinking water

38. Which of the following was discovered by Van Leeuwenhock in the late 1600s when he examined his own stools?

a. Naegleria
b. Giardia
c. Pneumocystis
d. Cryptosporidium
e. Entamoeba

39. Which is responsible for causing primary amebic meningoencephalitis?

a. Naegleria
b. Giardia
c. Pneumocystis
d. Cryptosporidium
e. Entamoeba

40. The causative agent of malaria is a/an

a. Amoeba
b. Protozoa
c. Sporozoa
d. Flagellated protozoa
e. Mosquito

41. The parasite CANNOT grow and reproduce in individuals with sickle cell

disease because

a. Erythrocytes have a low oxygen binding capacity
b. Hemoglobin-S is only one amino acid different from hemoglobin-A.
c. The parasite has a very active aerobic metabolism
d. All of the above
e. None of the above

42. Which of the following represents the form of plasmodium that is released from the erythrocyte by lysis?

a. Trophozoite
b. Schizont
c. Merozoite
d. Microgametocyte
e. Macrogametocyte

43. When an infected _____ takes a human blood meal, it introduces flagellated promastigotes into the skin of the definitive host.

a. Mosquito
b. Deer tick
c. Sand fly
d. Buffalo gnat

44. Epididymo-orchitis

a. Is associated with prostatitis
b. Is a complication of gonococcal urethritis
c. Is a manifestation of genital infection with ureaplasma spp
d. Occasionally complicates mumps
e. May be caused by mycobacterium tuberculosis

45. The antistreptolysin O titre is raised in infections caused by

a. Streptococcus sanguis
b. Streptococcus pneumonia

c. Streptococcus pyogenes
d. Streptococcus bovis
e. Streptococcus mutans

46. The following are causes of gas gangrene in man

a. Clostridium histolyticum
b. Clostridium septicum
c. Clostridium novyi
d. Clostridium sporogenes
e. Clostridium perfringens

47. The haemolytic uraemic syndrome

a. Is more common in children
b. In the majority of cases is caused by infection with verotoxin-producing Escherichia coli
c. Is rarely associated with haemorrhagic colitis
d. Is caused by an infective agent that may be transmitted with food
e. May be present as an acute abdomen

48. In tuberculosis infection of the urinary tract

a. The renal pelvis is most commonly affected
b. Nephrectomy is usually necessary in addition to antituberclosis chemotherapy
c. The demonstration of acid-fast bacilli in an early morning sample of urine is usually diagnostic
d. Sterile pyuria is a consistent laboratory finding
e. Mycobacterium tuberculosis is the species most commonly involved

49. The diagnosis of pseudomembranous colitis (PMC) is aided by

a. Colonoscopic biopsy of lesions
b. Positive blood culture for clostridium difficile
c. Raised antibody levels in blood to clostridium difficile toxin
d. Isolation of clostridium difficile from the stool

e. Detection of clostridium difficile toxin in the stool

50. Which of the following designates a dermatophytic infection of the groin?

a. Tinea corporis
b. Tinea cruris
c. Tinea pedis
d. Tinea manuum
e. Tinea unguium

51. Histoplasmosis is an occupational disease among

a. Home gardeners
b. Florists
c. Farmers
d. Spelunkers
e. Veterinarian

52. Only _____ and humans demonstrate the disease and harbor the fungus causing histoplasmosis

a. Aphids
b. Spider mites
c. Rats
d. bats
e. cats

53. All of the following are reasons for the current rise in emerging diseases EXCEPT

a. expansion from urban to rural areas brings people into closer contact with the animals and microbes that cause these diseases
b. changes occurring in the infectious agents that allows them to infect new Hosts
c. increased travel between continents
d. increasing numbers of unvaccinated and therefore susceptible children and adults

e. all the above are reasons for the increase in emerging diseases

54. all of the following are true with regard to bacteria EXCEPT

a. they are single-celled
b. most have rigid cell wall made of cellulose
c. they do not contain a true nucleus that is, they are prokaryotes
d. they multiply by binary fission
e. many have flagella for movement

55. Microbes that are very similar in shape, size and appearance to the bacteria but able to live and grow in environments of very high salt concentration and temperatures above boiling belong to which of these domains?

a. Prokaryotes
b. Eukarya
c. Archaea
d. Animalia
e. Protozoa

56. All of the following are true with regard to fungi EXCEPT

a. They are eukaryotes
b. Some are single-celled and others are multicellular
c. Most are photosynthetic and derive their energy from sunlight
d. Yeasts, molds, and mushrooms are examples of fungi
e. All of the above are true regarding fungi

57. Organisms that are large, complex, single-celled, lacking a cell wall, and frequently classified by their means of locomotion are

a. Bacteria
b. Yeast
c. Viruses
d. Fungi
e. Protozoa

58. Which of the following experimental requirements was necessary for Pasteur to disprove spontaneous generation?

a. Providing a nutrient source that would support microbial growth
b. Providing air
c. Preventing airborne microorganisms from entering the flask
d. Heating the flask to kill any microorganisms that were initially present in the broth
e. All of the above

59. The process of using microbes to destroy dangerous chemicals and pollution in the environment is called
a. Recombinant DNA technology
b. Biotechnology
c. Bioremediation
d. Microbial transformation
e. Microbial transduction

60. The scientist who discovered and characterized the first antibiotic(penicillin) was

a. Kosh
b. Pasteur
c. Lister
d. Fleming
e. Griffith

61. The type of symbiotic relationship escherichechia coli exhibits with the normal human host is best referred to as

a. Commensalism
b. Mutualism
c. Parasitism
d. None of the above

62. People who have substantial meat in their diet will have more _____ in their large intestine than those who have a

predominantly vegetarian diet

a. Bacteroides
b. Staphylococcus
c. Escherichia
d. Pseudomonas

63. When a parasitic organism grows and multiplies on or in the body of these host, a state _____ exist.

a. Disease
b. Secondary complication
c. Infection
d. Quality health

64. Organisms that cause disease only when introduced into an unusual locations or into an immunologically compromised host may best be classified as

a. Avirulent
b. Pathogens
c. Opportunist pathogens
d. Intent pathogens

65. Organisms such as rickettsia or viruses may be described as

a. Obligate intracellular parasites
b. Facultative pathogens
c. Extracellular parasites
d. Avirulent

66. Proteinacious agents that cause a number of neurodegenerative disease such as Creuzfeld-Jabob disease and Mad Cow disease are called

a. Viruses
b. Prions
c. Viroids

d. Phages
e. Plasmids

67. Tapeworms belong to which of the following groups?

a. Fungi
b. Protozoa
c. Multicellular parasites
d. Archaea
e. Prokaryotes

68. A process in which wine, beer, and milk are heated to destroy microorganisms that cause spoilage and increase the shelf life of these products is called

a. Centrifugation
b. Sterilization
c. Pasteurization
d. Autoclaving
e. Polymerization

69. Which of the following are ways that prokaryotes differ from eukaryotes?

a. They usually are much smaller
b. They lack a nuclear envelope
c. Most have a cell wall mode of peptidoglycan
d. They lack mitochondria and other membrane-bound organelles
e. They lack a cytoskeleton

70. Which of the following experimental requirements was necessary for Pasteur to disprove spontaneous generation?

a. Providing a nutrient source that would support microbial growth
b. Providing air
c. Preventing airborne microorganisms that were initially present in the broth
d. All of the above

71. A cellular nonliving agent consisting of a protein coat that surrounds a nucleic acid core are called

a. Viruses
b. Prions
c. Prokaryotes
d. Viroids
e. Nucleoproteins

72. Adenovirus has genes that suppress expression of class I MHC and thus evade being targeted by

a. T cells
b. Cells
c. Enzymes
d. Lytic factors

73. An example of an infection that is not communicable would be

a. Streptococcus infections
b. Staphylococcus infections
c. Clostridium infections
d. HIV infections

74. If a child has chickenpox and contracts a staphylococcal infection associated with the pox, the staphylococcal infection would be classified as

a. Primary
b. Secondary
c. Subacute
d. Chronic

75. The outcome of an infection depends on the

a. Virulence of the pathogen
b. Response of the host

c. Both a and b are correct
d. Neither a nor b is correct

76. An immunosuppressive response of stress is the production of

a. Complement
b. Catecholamines
c. Proteases
d. Corticosteroid hormones

77. When classifying the effects of a disease, one would classify a rash as a

a. Symptom
b. Sign
c. Virulent factor
d. None of the above

78. When symptoms do not occur or are mild enough to go unnoticed, the infection may be

a. Subclinical
b. Acute
c. Chronic
d. Focal

79. The transmission of Hepatitis B virus by the stick of a needle is an example of which of the following modes of transmission?

a. Direct contact
b. Vector
c. Airborne
d. Fomite

80. This part of the bacteria cell wall is responsible for the toxic properties of the endotoxin produced by some bacteria

a. O antigen

b. K antigen
c. H antigen
d. Lipid A

81. A type of cytolytic toxin which destroys red blood cells is called

a. Lipase
b. Hemolysin
c. Leukocidin
d. Streptokinase

82. The science that involves the study of the cause of disease and the distribution of health states in populations is called

a. Pathophysiology
b. Pathology
c. Epidemiology
d. Medicine
e. Entomology

83. Which of the following diseases would be classified as non-communicable?

a. Measles
b. Common cold
c. Influenza
d. Botulism
e. Chicken pox

84.