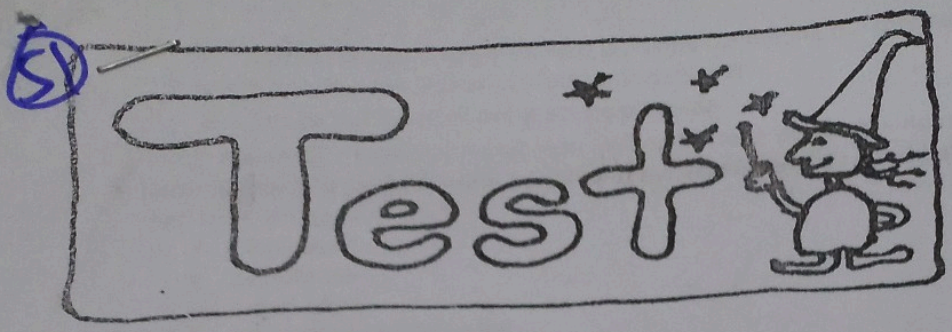

1

GENERAL MICRIOBIOLOGY-1

STUDENT NAME: [redacted]

MAXIMUM MARKS: 60 MARKS

MARKED OBTAINED: 23

TIME ALLOWED: 70 MINUTES

2018

1. Uptake by a recipient cell of soluble DNA released from a donor cell is defined as
   a. Conjugation
   b. Recombination
   c. Competence
   d. Transformation
   e. Transduction

2. Transfer of a donor chromosome fragment by a temperate bacterial virus is defined as
   a. Conjugation
   b. Recombination
   c. Competence
   d. Transformation
   e. Transduction

3. Direct transfer of a plasmid between two bacteria is defined as
   a. Conjugation
   b. Recombination
   c. Competence
   d. Transformation
   e. Transduction

4. Treatment of the culture with gentamicin, an inhibitor of protein synthesis, would have maximal effect on which of the phases?
   a. Lag phase
   b. Log phase
   c. Stationary phase
   d. Death phase
   e. Static phase

5. A bacterium is examined and is found to lack superoxide dismutase, catalase, and peroxidase. Which of the following statements best describes this bacterium?
   a. This bacterium is an anaerobe
   b. This bacterium will survive in an O2 environment

c. This bacterium is more virulent than one containing the three enzymes
d. This bacterium does not produce superoxide
e. This bacterium does not produce peroxide

6. Iron is essential in bacterial metabolism. When bacteria invade the human host they must capture iron in order to survive. Which of the macromolecules listed below is important in bacterial iron metabolism?
   a. Transferrin
   b. Lactoferrin
   c. Ferric oxide
   d. Lipopolysaccharide (LPS)
   e. Siderophores

7. Which one of the following is a prokaryote?
   a. Bacteria
   b. Algae
   c. Protozoa
   d. Fungi
   e. Slime molds

8. Which one of the following agents simultaneously contains both DNA and RNA?
   a. Bacteria
   b. Viruses
   c. Viroids
   d. Prions
   e. Plasmids

9. A 65-year-old man develops dementia, progressive over several months, along with ataxia and somnolence. An electroencephalographic pattern shows paroxysms with high voltages and slow waves, suggestive of Creutzfeldt-Jakob disease (CJD). By which of the following agents is this disease caused?
   a. Bacterium
   b. Virus
   c. Viroid
   d. Prion
   e. Plasmid

10. Chloramphenicol, an antibiotic that inhibits bacterial protein synthesis, will also affect which of the following eukaryotic organelles?
   a. Mitochondria
   b. Golgi complex
   c. Microtubules
   d. Endoplasmic reticulum
   e. Nuclear membrane

11. Which of the following structures is not part of the bacterial cell envelope?
   a. Peptidoglycan
   b. Lipopolysaccharide
   c. Capsule
   d. Lipid A
   e. Gas vacuole

gas vacuole ⟷ gas vacuole

12. Which of the following components is present in gram-negative bacteria but not in gram-positive bacteria?
   a. Peptidoglycan
   b. Lipid A
   c. Capsule
   d. Flagella
   e. Pili

oup A streptococci are the most common bacterial cause of pharyngitis in school-age children 5–15 years of age. The most important cell component involved in adherence of this bacteria to fibronectin, which covers the epithelial surface of the nasopharynx is

a. Capsule
b. Lipoteichoic acid
c. Flagella
d. Lipoprotein
e. O-antigen

14. In the fall of 2001, a series of letters containing spores of Bacillus anthracis were mailed to members of the media and to U.S. Senate offices. The result was 22 cases of anthrax, with five deaths. The heat resistance of bacterial spores, such as those of Bacillus anthracis, is partly attributable to their dehydrated state and partly to the presence of large amounts of:

a. Diaminopimelic acid
b. d-Glutamic acid
c. Calcium dipicolinate/ dipicolinic acid
d. Sulfhydryl-containing proteins
e. Lipid A

15. Mycoplasma species lack which of the following components?

a. Ribosomes
b. Plasma membrane
c. Both DNA and RNA
d. Lipids
e. Peptidoglycan/ cell wall

16. The DNA polymerase from Thermus aquaticus is an important component of DNA amplification methods such as the polymerase chain reaction. This organism is capable of growing at temperatures above 100°C. Organisms that are capable of growth at such high temperatures are referred to:

a. Mesophiles
b. Psychrophiles
c. Halophile
d. Thermophilic
e. Microaerophilic

17. The growth rate of bacteria during the exponential phase of growth is

a. Zero
b. Increasing
c. Constant
d. Decreasing
e. Negative

18. The growth rate of bacteria during the maximum stationary phase of growth is:

a. Zero
b. Increasing
c. Constant
d. Decreasing
e. Negative

19. Most microorganisms pathogenic for humans grow best in the laboratory when cultures are incubated at

a. 15–20°C
b. 20–30°C
c. 30–37°C
d. 38–50°C
e. 50–55°C 2.

20. Which of the following is NOT a mechanism for generating metabolic energy by microorganisms?

a Fermentation

b. Protein synthesis
c. Respiration
d. Photosynthesis
e. C and D

21. Mutations in bacteria can occur by which of the following mechanisms?
    a. Base substitutions
    b. Deletions
    c. Insertions
    d. Rearrangements
    e. All of the above

22. The form of genetic exchange in which donor DNA is introduced to the recipient by a bacterial virus is
    a. Transformation
    b. Conjugation
    c. Transfection
    d. Transduction
    e. Horizontal transfer

23. A 26-year-old woman visits her physician because of an unusual vaginal discharge. On examination, the physician observes a thin, homogeneous, white-gray discharge that adheres to the vaginal wall. The pH of the discharge is 5.5 (normal, <4.3). On Gram stain, many epithelial cells covered with gram-variable rods are seen. Bacterial vaginosis is diagnosed. Which one of the following normal genital flora microorganisms is greatly decreased in bacterial vaginosis?
    a. Corynebacterium species
    b. Staphylococcus epidermidis
    c. Prevotella species
    d. Candida albicans
    e. Lactobacillus species

24. Certain microorganisms are never considered to be members of the normal flora. They are always considered to be pathogens. Which one of the following organisms fits into that category?
    a. Streptococcus pneumoniae
    b. Escherichia coli
    c. Mycobacterium tuberculosis
    d. Staphylococcus aureus
    e. Neisseria meningitidis

25. Antimicrobial therapy can decrease the amount of susceptible bowel flora and allow proliferation of relatively resistant colonic bacteria. Which one of the following species can proliferate and produce a toxin that causes diarrhea?
    a. Enterococcus species
    b. S epidermidis
    c. Pseudomonas aeruginosa
    d. Clostridium difficile
    e. Bacteroides fragilis

26. Which one of the following microorganisms can be part of the normal vaginal flora and cause meningitis in newborns?
    a. C albicans
    b. Corynebacterium species
    c. S epidermidis
    d. Ureaplasma urealyticum
    e. Group B streptococci

group B- meningitis

...l plaque and periodontal disease can be thought of as a continuum of what type of ...siological process?

a. Biofilm formation
b. Normal aging
c. Abnormal digestion
d. Exaggerated immune response
e. Chewing gum

28. Which one of the following microorganisms is closely associated with dental caries?

a. C albicans
b. Streptococcus mutans
c. Pseudomonas
d. Neisseria
e. Staph epidermidis

29. Strept pneumoniae can be part of the normal flora of 5–40% of people. At what anatomic site can it be found?

a. Conjunctiva
b. Nasopharynx
c. Colon
d. Urethra
e. Vagina

30. Which of the following enzymes is most likely involved in the following reaction?

$$2O^{2-} + 2H^{+} \rightarrow H_2O_2 + O_2$$

a. ATPase
b. Catalase
c. Oxygen permease
d. Peroxidase
e. Superoxide dismutase

31. Which of the following content is present in periplasmic space?

a. Genetic material such as DNA or RNA
b. Hydrolytic enzymes such as β-lactamases
c. Lipid A
d. LPS
e. Teichoic acid

32. When the base substitution result in a codon that simply cause a different amino acid to be inserted, the mutation is called.

a. Inversion
b. Missense
c. Nonsense
d. Transition
e. Transversion

33. A week-old infant is diagnosed with meningitis. A lumbar puncture reveals numberous neutrophils and gram-positive rods. She is admitted to the hospital and started on IV β-lactams. Which of the following targets would most likely play a role in the development of resistance to the antibiotics?

a. Bactoprenol
b. DNA gyrase
c. Penicillin-binding proteins
d. Reverse transcriptase
e. RNA polymerase

34. Certain bacterial infectious diseases are diagnosed by detecting antibodies in patient's serum. Which of the following bacterial cell component is highly antigenic in nature?

a. Capsule
b. Flagellae
c. Endospore
d. Plasmid
e. Peptidoglycan

35. A gram positive non motile prokaryote isolated from the wound swab of a 5 year old child, which of the following characteristic differentiate it from eukaryotes?
a. Prokaryotes do not have membrane-bound organelles.
b. The nucleoid is a region where the circular chromosome (DNA) is located
c. Size of cell typically 0.2-2.0 µm in diameter
d. Ribosomes larger size (80s); smaller size (70s) in organelles
e. Cell division by mitosis.