

Microbe Mission C Answer Key

Science Olympiad North Regional Tournament at the
University of Florida



Part 1: Microscopes

12 points total; 0.5 point identification, 0.5 point function):

A. Eyepiece tube-transmit image from objective to eyepiece lens	B. Revolving nosepiece: holds two or more objective lenses
C. Objective lens: primary lenses that magnify the specimen	D. Stage clips: hold slide in place
E. Diaphragm: controls the amount of light entering the condenser	F. Illuminator (Light): light source
G. Eyepiece: magnifies the image of the objective lens by 10X (accepted: magnifies the object)	H. Arm: connects to the base and helps to carry the microscope
I. Stage: place where the specimen is mounted	J. Coarse focus adjustment knob (accepted: adjustment knob): moves the stage up and down to focus on the specimen
K. Fine focus adjustment knob: brings specimen into sharp focus	L. Base: Support the microscope (accepted: Position the microscope)

Part 2: Microbial Structural

1. 8 points, 1 point for each correct answer

A. Smooth endoplasmic reticulum (accepted: Smooth ER)	B. Cytoplasm
C. Mitochondria	D. Rough endoplasmic reticulum (accepted: Rough ER)
E. Plasma membrane (accepted: Cell coat)	F. Nucleolus
G. Nucleus (accepted: nuclear envelope)	H. Golgi apparatus (accepted: Golgi body)

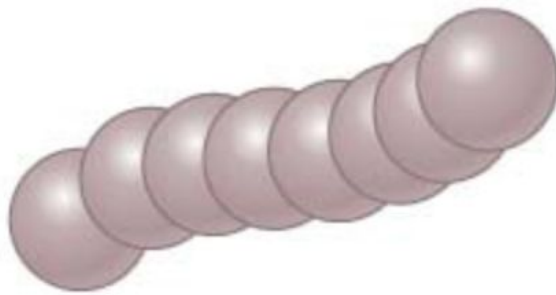
Part 3: Microbial Shape

Name the bacterial shape and its arrangements (11 points, 1 point for each correct answer):

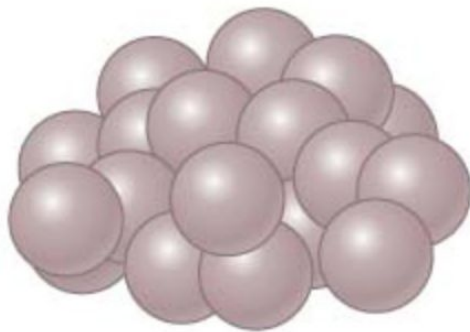
General Shape: Cocci (accepted: sphere)



Arrangement name: Diplococci



Arrangement name: Streptococci



Arrangement name: Staphylococci

General Shape: Spirilla (accepted: Spiral)



Arrangement name: Spirillum



Arrangement name: Spirochetes

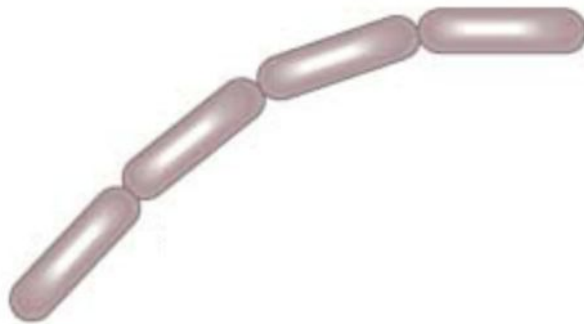
General Shape: Baccilli (accepted: Rod shape)



Arrangement name: Single (accepted: single bacillus)



Arrangement name: Diplobacilli



Arrangement name: Streptobacilli

Part 4: Microbial Diseases

10 points total; 1 point for each correct answer

1. A
2. C
3. B
4. D
5. B
6. D
7. C
8. C
9. B
10. A

Part 5: Microbial Organism

30 points total; 2 point per each correct answer

1. B
2. B
3. B
4. C
5. D
6. C
7. D
8. A
9. D
10. C
11. B
12. B
13. C
14. A
15. D

Part 6: Gram Stain

1. Gram-negative and Gram-positive bacteria differ in their response to different antibiotics (3 points)
2. B, because the stain is pink (*Pseudomonas aeruginosa*, -) (2 points total, 1 point for correct identification, 1 point for explanation)
3. A, because the stain is purple (*Staphylococcus aureus*, +) (2 points total, 1 point for correct identification, 1 point for explanation)
4. Rod-shape (1 point)
5. Cocci (accepted: spherical) (1 point)

Part 7: Tiebreaker

1. Calculation: Number of colonies on plate x reciprocal of dilution of the sample is equal to number of bacteria/mL (1 point for correct answer, 1 point for showing the work)
 $551 \text{ colonies} \times 1,000,000,000 = 5.51 \times 10^{11} \text{ bacteria/mL in the sample}$
2. 2 points total; 1 point for each answer
 - a. Drug mixtures tackle different aspects of viral replication (accepted: multiple drugs attacked multiple stages of replication of HIV)
 - b. Unlikely virus will have multiple random mutations to a mixture of different drugs (accepted: multiple drugs attacked multiple mutation of HIV)
3. 2 points total; 1 point for each correct answer in the following list
 - a. DNA inside the organelles
 - b. Ribosomes
 - c. Double membrane
 - d. Reproduction
 - e. ATP production