

## UMSO INVITATIONAL Microbe Mission ANSWER KEY

### **Station 1 (10 pts.):**

- 1) (1 pt.) (TB #2) play an important role in an ecosystem as decomposers (break down dead or waste organic matter)
- 2) (2 pts./ 1 pt. per difference) cell wall structure and lack peptidoglycan
- 3) (6 pts./1 pt. per section)
  - a. decreases
  - b. increases
  - c. decreases
  - d. darker
  - e. increases
  - f. reduced
- 4) (1 pt.) 0.4 mm

### **Station 2 (6 pts.):**

- 5) (1 pt.) lag phase
- 6) (1 pt.) waste and dead cells begin to accumulate
- 7) (1 pt.) log/exponential
- 8) (1 pt.)  $1.6 \times 10^4$
- 9) (2 pts.) (TB #3) uses multiple sets of streaks to dilute the sample enough so that distinct well-isolated colonies will form (one streak = dipping sterilized inoculating loop into culture and drawing it across agar plate)

### **Station 3 (14 pts.):**

- 10) (2 pts./1 pt. per part) G, iii
- 11) (2 pts./1 pt. per part) E, iv
- 12) (2 pts./1 pt. per part) D, vi
- 13) (2 pts./1 pt. per part) F, i

14) (2 pts./1 pt. per part) A, vi

15) (2 pts./1 pt. per part) C, ii

16) (2 pts./1 pt. per part) B, v

**Station 4 (6 pts.):**

17) (1 pt.) light or optical microscope

18) (2 pts./1 pt. per correct letter) A and H

19) (1 pt.) E

20) (1 pt.) revolving nosepiece

21) (1 pt.) to focus light onto the specimen

**Station 5 (10 pts.):**

22) (2 pts.) (TB #1) the DNA of the cell and a small amount of the cytoplasm gather at one region of the cell

23) (2 pts.) (TB #4) terminal is when DNA/cytoplasm gather at the end of cell, central is where DNA/cytoplasm gather in center of the cell

24) (1 pt.) treat in an autoclave with steam under pressure

25) (1 pt.) helps the organism survive in unfavorable environmental conditions

26) (2 pts./1 pt. per condition) ex. lack of nutrients/oxygen, extreme temperatures, lack of moisture, and presence of toxic chemicals

27) (2 pts./1 pt. for description & 1 pt. for purpose) repeated dilution of a solution to reduce a dense culture of cells to a more usable concentration

**Station 6 (6 pts.):**

28) (1 pt.) norovirus

29) (1 pt.) cryptosporidiosis

30) (1 pt.) trichinosis

31) (1 pt.) chronic wasting disease

32) (1 pt.) histoplasmosis

33) (1 pt.) botulism

**Station 7 (11 pts.):**

34) (2 pts./1 pt. per prevention) (TB #5) minimize unnecessary prescribing and overprescribing of antibiotics, complete the entire course of any prescribed antibiotic, practice good hygiene (handwashing, etc.)

35) (1 pt.) because the lipid bilayer of their outer membrane excludes entry of the drug

36) (1 pt.) (TB #7) previously sensitive organism develop resistance through spontaneous mutation or the acquisition of new genetic information

37) (1 pt.) gram positive

38) (1 pt.) gram positive

39) (1 pt.) gram negative

40) (1 pt.) gram positive

41) (1 pt.) gram negative

42) (1 pt.) gram negative

43) (1 pt.) gram positive

**Station 8 (10 pts.):**

44) (1 pt.) rhinovirus

45) (1 pt.) influenza virus

46) (1 pt.) staphylococcus

47) (1 pt.) lactobacillus

48) (1 pt.) E. coli

49) (1 pt.) yeast

50) (1 pt.) diatoms

51) (1 pt.) amoeba

52) (1 pt.) 3290 millimeters

53) (1 pt.) microbe X

**Station 9 (8 pts.):**

54) (1 pt.) (TB #6) a region that is devoid of fish and other marine life

55) (2 pts.) (TB #8) the microbe has become established and is multiplying on a body's surface

56) (1 pt.) E. Coli

57) (1 pt.) Proteinaceous infectious particles

58) (1 pt.) ex. norovirus, cholera, botulism, cryptosporidiosis, giardiasis, paralytic shellfish poisoning, tapeworm, trichinosis

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**Station 10 (8 pts.):**

61) (1 pt.) A

62) (1 pt.) C

63) (1 pt.) B

64) (1 pt.) E

65) (1 pt.) F

66) (1 pt.) D

- 67) (1 pt.) pleomorphic
- 68) (1 pt.) fruiting body

**Station 11 (11 pts.):**

- 69) (1 pt.) mitochondria and chloroplasts were bacteria residing within other cells in a mutually beneficial partnership
- 70) (2 pts./1 pt. per evidence) mitochondria and chloroplasts carry some of the genetic information necessary for their function (genes for some ribosomal proteins and RNAs that make up their 70S ribosomes), mitochondria and chloroplasts were once intracellular bacteria in the double membrane that surrounds these organelles
- 71) (1 pt.) ATP generating powerhouse
- 72) (1 pt.) harvest sunlight to generate ATP
- 73) (1 pt.) nucleus contains DNA
- 74) (1 pt.) nucleolus
- 75) (1 pt.) chromosomes
- 76) (1 pt.) nuclear envelope
- 77) (1 pt.) nuclear pores
- 78) (1 pt.) chromatin

**Station 12 (11 pts.):**

- 79) (1 pt.) F (Fungi)
- 80) (1 pt.) F (Fungi)
- 81) (1 pt.) V (Virus)
- 82) (1 pt.) P (Prion)
- 83) (1 pt.) F (Fungi)
- 84) (1 pt.) B (Bacteria)
- 85) (1 pt.) False

86) (1 pt.) False

87) (1 pt.) True

88) (1 pt.) True

89) (1 pt.) False

**Station 13 (10 pts.):**

90) (2 pts./1 pt. per mode) showering, changing underwear/bed linen daily, laundry in hot water, not scratching, washing hands

91) (1 pt.) antibiotics

92) (2 pts./1 pt. per mode) wear shower shoes/sandals, keep feet dry, wash and dry feet every day, alternate shoes worn every day

93) (1 pt.) no treatment, can relieve symptoms with pain killer

94) (1 pt.) stay in air-conditioned housing, wear protective clothing, use mosquito repellent

95) (1 pt.) medications that are active against the parasite forms in the blood

96) (1 pt.) vaccine

97) (1 pt.) no treatment

**Station 14 (10 pts):**

98) (a) (1 pt.) no  
(b) (1 pt.) yes  
(c) (1 pt.) no

99) (2 pts./1 pt. for each question) It is important to use a new inoculation loop for each section of a streak plate, so each streak will not be contaminated. If a new inoculation loop isn't used, the streak won't be dilute because it will use the existing bacteria on the inoculation loop rather than pulling a small number of bacteria from the previous streak.

100) (5 pts./2 pts. per question, 1 pt. for showing work)  
5 dilutions, 50 colonies

**Station 15 (7 pts):**

101) (1 pt.) exists in 2 different forms

102) (1 pt.) from decaying matter

103) (1 pt.) s-layer

104) (1 pt.) True

105) (1 pt.) gram-positive

106) (1 pt.) gram-negative

107) (1 pt.) gram-negative