

## IvySpear's SSSS Div. C Microbe Mission Test Answer Key

1. This phenomenon is usually caused by unfavorable growth conditions for the host cell (such as starvation) **(1pt)** and is terminated with initiation of either true lysogenization or lytic growth when growth conditions improve **(1pt)**
2. In episomal virus latency, the DNA stays in the cytoplasm. In proviral latency, the DNA is integrated into the nucleus **(1pt)**
3. HIV Virus **(1pt)**, Varicella-zoster virus **(1pt)**, Measles **(1pt)**. If the virus(es) named is not among these three, search it up. If it correct, give 1pt to each virus **(honor system here, you're the only one who loses if you cheat)**
4. 8 minutes **(2pt)**
5. Egress or release of new virions**(1pt)**
6. Host cells do not possess the mechanisms required to replicate RNA so the virus has to use it's own enzyme which cannot occur in the nucleus, so it's in the cytoplasm **(2pt)**
7. Bacterial endospores **(2pt)**
8. *Sarcina* **(2pt)**
9. The air would interfere with the path of the electron beams **(1pt)**
10. It's used to detect voids, cracks, and delaminations within microelectronic packages **(1pt)**
11. The detailed shape of the scanning tip is sometimes difficult to determine. **(1pt)** Its effect on the resulting data is particularly noticeable if the specimen varies greatly in height over lateral distances of 10 nm or less. **(1pt)**  
The maximum image size is generally smaller. **(1pt)**
12. Rayleigh's **(2pt)**
13. It may offer better contrast for biological samples **(1pt)**, and neutrons easily penetrate samples, thereby reducing artifacts produced with other techniques requiring thin slices, staining or fixing. **(1pt)**
14. SEM **(2pt)**
15. Fluorescent Microscope **(1pt)**
16. Phase contrast **(1pt)**

17. Acid Fast stain (**1pt**), it's used to stain otherwise un-stainable bacteria such as *Mycobacterium* (**1pt**)

18. They are too small to be stained (**1pt**). Answer may vary, but a valid one would be *Mycobacterium* (**1pt**) due to a high lipid content/waxy outer layer (**1pt**)

19.

- a. Gram-negative (**1pt**)
- b. Neither (Also accept unstainable) (**1pt**)
- c. Gram-positive (**1pt**)
- d. Gram-negative (**1pt**)
- e. Gram-negative (**1pt**)

20. Fixing nitrogen for plant use (**2pt**)

21. Lactic acid bacteria produce lactic acid, usually from sugars or other carbohydrates. Lactic acid is an important byproduct because it can act as a strong fertilizer (**1pt**), suppresses harmful microorganisms (**1pt**), increases rapid decomposition of organic matter (**1pt**), and ferments organic matter without the smell and other harmful outcomes (**1pt**). (**Only 3pt can be given for this question, even if all four reasons are given**)

22. Prebiotics are indigestible food ingredients that promote the growth of beneficial microorganisms in the intestines. Basically, you wouldn't digest these well, but the probiotics living in your stomach live on them. (**2pt**)

23. Mutation of the target site for the antimicrobial agent(**1pt**), destruction or inactivation of the antimicrobial agent (Through enzyme activity) (**1pt**), or removal of the antimicrobial agent from the bacteria by pumping the antimicrobial agent out of the bacteria in a process called efflux(**1pt**)

24. Must mention selective pressure (**2pt**)

Any three of the following will suffice (**1pt for each, at most 3pt in total**)

- *Salmonella typhimurium*
- *Salmonella newport*
- *Salmonella heidelberg*
- *Salmonella enteritidis*
- *Enterococcus faecalis* / *Enterococcus faecium*
- *Staphylococcus aureus*
- *Streptococcus pneumoniae*
- *Mycobacterium tuberculosis*

25. Measles (**2pt**)

26. Estuary Associated Syndrome (**2pt**)

27. Schistosomiasis (**2pt**)

28. Syphilis (**2pt**)

29. Rubella (**2pt**)

30. Benzylpenicillin (**2pt**)

31. Gram-positive (**1pt**). It inhibits the proteins which cross-link peptidoglycans in the cell wall. So when the bacteria tries to divide, it can't fill in the holes in the peptidoglycan (**1pt**)

32. Lowering fever (**1pt**), ibuprofen (**1pt**)