**Cowan Microbiology Fundamentals, 3/e, Critical Thinking Questions**

**Chapter 2**

1. Your patient presents with a skin lesion that you believe to be impetigo, a bacterial infection. List the steps you will take to identify the pathogen(s) causing this infection, summarizing the tools and methods used in this process.
2. Which type(s) of medium would be used in each scenario?

a. isolating the growth of *Streptococcus pyogenes* from a patient’s throat swab

b. isolating a pathogen from a patient’s clean-catch urine sample

c. isolating enteric bacteria such as *Escherichia coli* from a sample of organically

grown spinach

d. maintaining a patient’s nasal swab specimen for further analysis and identification of possible respiratory syncytial virus (RSV) infection

1. a. Explain whether or not any of the methods in figure 2.9 could be used to determine the total number of cells present in a patient’s specimen.

b. After performing the streak plate method on a bacterial specimen, the culture was

incubated for 48 hours at 37°C. Upon viewing the plate, there was heavy growth

(with no isolated colonies) in the first quadrant, but no growth was apparent in the remaining quadrants. Please discuss errors in the procedure that could have

produced this result.

1. a. Lactophenol cotton blue is utilized to stain the colorless cytoplasm of *Amoeba proteus,* a common pond protozoan. Please discuss which property of microscopy is enhanced by using this dye.

b. Which type of microscopy would provide the best image in each scenario?

• visualizing a viral pathogen in a patient’s lung biopsy

• visualizing the presence of multiple organisms within a specimen

• visualizing the organelles within a eukaryotic cell

1. You have been told to obtain a sputum sample and to perform microbiological staining in order to determine the identity of the pathogen causing a patient’s illness. You first perform a Gram stain, but upon microscopic analysis you visualize a mixture of pink and purple bacilli. Explain the results you have just observed, and discuss what you may now do in order to identify the pathogen.