Miramar College, Biology 205 Microbiology
Lab Exam I Study Guide

In addition to this study guide, use your notes, text, lab manual and other resources (*i.e.*, **the *Objectives* & *Discussion* section of the Labs and the bold words in the *Background* and *Introduction* sections**) to make sure that you are fully prepared for your exam. Topics & experiments covered in lab are fair game, even if you personally did not perform them.

Lab 1: The Microscope

- Define: compound light microscope, resolution, condenser, depth of view, field of view, micrometer.
- Identify: objective, stage, coarse focus knob, fine focus knob, ocular, stage adjustment knobs, dimmer.
- Understand the relationship between the four objectives, and how the change in magnification affects the change in the field of view.
- Calculate the field of view for a microscope when shown the stage micrometer in view (Remember that each tick mark is 10µm).

Lab 2: Aseptic Technique

- Define: pure culture, aseptic technique, sterilization, autoclave, inoculate, agar, complex media, chemically defined media, sanitize.
- Know the principles of aseptic technique; the steps in transferring bacteria using sterile technique.
- Recognize the errors in aseptic technique that would result in a lack of growth of the target organism and/or growth of a different organism.

Lab 3: Microbial Ubiquity

- Define: normal flora, ubiquity

Lab 4: The Smear and Simple Staining

- Define: smear, heat fixing, basic/positive dye, acidic/negative dye, morphology, arrangement, cocci, bacilli, strepto-, staphylo-
- Know the theory behind acidic and basic staining techniques.
- Know what makes a good smear, including heat fixing. What must you do differently when making a smear from a liquid culture and a solid culture? What about a culture that isn't very turbid?
- Be able to describe bacterial morphology and arrangement using correct scientific terminology.

Lab 5: The Gram Stain

- Define: Gram stain, Gram positive, Gram negative, mordant, counterstain, Know the principles behind staining techniques- what in the cell is causing it to retain the primary stain.
- What are the four components of the Gram stain? What color are Gram positive and Gram negative cells at the end of each step?
- What went wrong with the Gram stain if: a Gram negative was purple, a Gram positive was pink, or there were no organisms visible?
- Be able to perform a successful Gram stain.

Lab 6: Pure Culture Techniques

- Define: viable cell, colony, colony forming unit (CFU).
- Why are plates handled and inoculated upside down?
- Why is it important to have and maintain a pure culture?
- Be able to evaluate an incubated streak plates for errors in preparation.
- Be able to perform a streak plate (including proper labeling and incubation).

Lab 7: Microbial Motility

- Define: motility, flagella, monotrichous, lophotrichous, peritrichous, amphitrichous, positive and negative taxis.
- Recognize motile and non-motile organisms in motility medium. Recognize swarming motility on solid media.
- Understand why 2,3,5-triphenyltetraolium chloride is used.
- What are the pros/cons of wet mounts and motility media?

Labs 8: Differential & Special Staining

- Define: endospore, sporulation, germination, vegetative cell, acid fast, mycolic acid.

- Why/how do endospores and acid-fast bacteria cause Gram positive irregular results?
- Know the principles behind staining techniques- what in the cell is causing it to retain the primary stain.
- What are the four components of the Spore and AFB stain? What color are positive and negative cells at the end of each step?
- Recognize spores, vegetative cells, AFB and non-AFB cells microscopically.