B. 20 points  Multiple choice 2 points each. **Circle the correct answer**

1. The person responsible for introducing sterile technique into surgical procedures was ______________.
   A. van Leeuwenhoek
   B. Mullis
   C. Lister
   D. Koch

2. Secondary structures of proteins include
   A. alpha helices
   B. dipole moments
   C. subunit interactions
   D.

3. An organism has been isolated which has the following characteristics: its lipids contain ester-linkages; a cell wall without peptidoglycan, and branched chain hydrocarbons (isoprene). To which group of microbes does this one belong?
   A. Bacteria
   B. Cyanobacteria
   C. Archaea
   D. Eukaryote
   E. Heterocyst

4. You have been given a nucleic acid that contains the following: cytosine, adenine, guanine, and phosphate. What type(s) of nucleic acid(s) is this?
   A. DNA
   B. RNA
   C. RNA and DNA
   D. neither

5. Which one of the following structures is never present in a prokaryotic cell?
   A. cell wall
   B. cell membrane
   C. ribosomes
   D. membrane-bound nucleus
   E. flagella

6. A membrane transport protein is being studied and it is noted that a second substance is simultaneously transported out of the cell with the first. Which type of transport protein is involved here?
   A. uniporter
   B. symporter
   C. gympporter
   D. antiporter

7. *Clostridium* spores
A. Are resistant to heat and desiccation
B. Look very similar to vegetative cells
C. Can be metabolically inactive for long periods of time
D. A & B
E. A & C

8.

9. The process of translation involves:
   messenger RNA
   ribosomal RNA
   transfer RNA
   more than one of the above
   all of the above

10. Hydrogen bonding is important in which of the following?
    the proper folding of polypeptide chains
    the formation of double-stranded nucleic acids
    the formation of peptide bonds
    a and b above
    all of the above

C. Four short answer essay questions (total = 30 points)
1. (5)

2. (5) As part of the team of scientists for the space program, you are trained to look for life on other planets. You find some unusual "creatures". What criteria do you use to determine if they are living?

3. (10) This is a section of a bacterial cell. Identify each labeled parts.
   A______________________
   B______________________
D. What type of cell is this?

4. (10) This is a section of a bacterial cell. Identify each of the labeled parts.

A

B

C

D. What type of cell is this?

D. 20 points Fill in, 2 points each

A chemist who is famous for inventing a heat treatment that saved the wine industry in France is ____________

Dipicolinic acid is a compound that is found only in what type of cell ____________.
The portion of the membrane of Gram negative bacteria that can make people ill is called ________________________________.

Name two pyrimidines _____________________ and ___________________________

The $C_{55}$ isoprenoid alcohol molecule in the membrane that is a carrier for peptidoglycan synthesis is ____________________.

Microbes sometimes have inclusion bodies that are storage materials. Name one type of inclusion material the you might see in a cell. ________________________________

Recently, there were two reports in the press about harmful bacteria. I mentioned these in class. One is a bacterium (a Gram + coccus) which has become resistant to vancomycin. What organism is this? ________________________________. The second bacterium has caused several deaths in the past few years as a contaminant of meat - and people get sick eating meat that has not been cooked long enough. What organism is this ________________________________.

E. 10 points. The two compounds shown below represent monomers that are used to make essential polymers in the cells. What type of monomer does each compound represent and what polymer(s) can be formed from each of these?

Name of this monomer: ________________________________

Name of the polymer which can be made from this monomer:

__________________________________

Name of this type of monomer: ________________________________

Name of the polymer which can be made from this monomer: