1. a) Discuss the significance of Food Microbiology in Biotechnology.

Ans: Food microbiology is the study of the microorganisms that inhabit, create, or contaminate food. Of major importance is the study of microorganisms causing food spoilage. "Good" bacteria, however, such as probiotics, are becoming increasingly important in food science. In addition, microorganisms are essential for the production of foods such as cheese, yogurt, and other fermented foods such as bread, beer, and wine.

Food safety
Food safety is a major focus of food microbiology. Pathogenic bacteria, viruses and toxins produced by microorganisms are all possible contaminants of food. However, microorganisms and their products can also be used to combat these pathogenic microbes. Probiotic bacteria, including those that produce bacteriocins, can kill and inhibit pathogens. Alternatively, purified bacteriocins such as nisin* can be added directly to food products. Finally, bacteriophages, viruses that only infect bacteria, can be used to kill bacterial pathogens. Thorough preparation of food, including proper cooking, eliminates most bacteria and viruses. However, toxins produced by contaminants may not be heat-labile, and some are not eliminated by cooking.

b) What are the common hazards to food safety? Explain any one.

Ans: There are four types of hazards that you need to consider:

- Biological hazards
  Microbiological hazards include bacteria, yeasts, moulds and viruses.

- Chemical hazards
  Chemical hazards include water, food contact materials, cleaning agents, pest control substances, contaminants (environmental, agricultural and process e.g. acrylamide), pesticides, biocides and food additives.

- Physical hazards
  Physical hazards include glass, packaging, jewellery, pest droppings, screws etc.

- Allergens
  This refers to the risk associated with the unintended presence of one or more of the 14 EU listed food allergens due to cross-contamination.

Biological Hazards
Foods can contain biological hazards. These hazards can come from raw materials or from food-processing steps used to make the final product. Table A (at the end of the chapter) provides a list of biological hazards.

- Microorganisms
  Organisms too small to be seen with the naked eye are called microorganisms. Microorganisms live everywhere: air, dirt, fresh and salt water, skin, hair, animal fur and plants. Microorganisms are classified into various groups. A few groups important in foods include yeasts, molds, bacteria, viruses and protozoa. Since microorganisms are so widespread, it is important to understand when to be concerned about them and how to deal with them.

c) Name a few diseases which are caused due to parasitic infection. Discuss any two in detail.

Ans: A parasitic disease, also known as parasitosis, is an infectious disease caused or transmitted by a parasite. Many parasites do not cause diseases as it may eventually lead to death of both organism and host. Parasitic diseases can affect practically all living organisms, including plants and mammals. The study of parasitic diseases is called parasitology. Some parasites like Toxoplasma gondii and Plasmodium spp. can cause disease directly, but other organisms can cause disease by the toxins that they produce.

Signs and symptoms
Symptoms of parasites may not always be obvious. However, such symptoms may mimic anemia or a hormone deficiency. Some of the symptoms caused by several worm infestations can include itching affecting the anus or the vaginal area, abdominal pain, weight loss, increased appetite, bowel obstructions, diarrhea, and vomiting eventually leading to dehydration, sleeping problems, worms present in the vomit or stools, anemia, aching muscles or joints, general malaise, allergies, fatigue, nervousness. Symptoms may also be confused with pneumonia or food poisoning.

Causes
See also: List of human parasitic diseases
Mammals can get parasites from contaminated food or water; bug bites, or sexual contact. Ingestion of contaminated water can produce Giardia infections.
Parasites normally enter the body through the skin or mouth. Close contact with pets can lead to parasite infestation as dogs and cats are host to many parasites.
Other risks that can lead people to acquire parasites are walking with barefeet, inadequate disposal of feces, lack of hygiene, close contact with someone carrying specific parasites, and eating undercooked foods, unwashed fruits and vegetables or foods from contaminated regions.
Parasites can also be transferred to their host by the bite of an insect vector, i.e. mosquito, bed bug, fleas.

Treatment
Parasitic infections can usually be treated with antiparasitic drugs.