MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

III SEMESTER B.TECH. EXTERNAL EXAMINATIONS NOVEMBER 2019

SUBJECT: INDUSTRIAL MICROBIOLOGY [BIO 2155]

Q1. The spoilage of foods is dependent on its water activity (a_w). List out two methods to control the water activity of the food. Inspite of the controls taken, the food can be spoilt. What according to you are the ways the following items can be spoilt a) Tomato Sauce b) Canned food (4)

Q2 Aging is an important step in the cheese production. What changes does the cheese undergo during this step?

In some of the chocolate processing industries, enzymes are added in pre-treatment step instead of the traditional method. The step hastens the process of making the chocolate. What would be the implications on the final product by this change? (3)

Q3 Is vinegar a product of lactic acid fermentation. Justify with the help of a flow diagram. (3)

Q4. The entire path of electron in Transmission electron microscopy (TEM) is evacuated. Why do you think the vacuumed environment has to be created in TEM? How can the magnification be controlled by the electromagnets in TEM? The specimen to be viewed with TEM has to be thin. What would happen if we have thick specimens? Explain the impact with the ray diagram. (4)

Q5. What would the bacteria which are spherical in shape be called? How are the sarcinae and staphylo arrangement formed. Draw a diagram of the final arrangement. (3)

Q6. A conjugation experiment is carried out between F^+ gly^+ leu^+ thr^+ pro^+ bacteria and F^- gly^- leu^- thr^- pro^- bacteria for a period of 35 minutes. The mating was interrupted and the genotype of the recipient F^- bacteria were determined. The results are shown below:

Genotype	Number of colonies
gly^+	0
leu^+	13
thr^+	36
pro^+	20

What is the probable order of these genes on the bacterial chromosome? Draw the cross over depicting the conjugation process. (3)

Q7. In one of the case studies observed, a four-month-old male infant initially showed refusal of feeds, hyperactive bowel sound, vomiting, and diarrhea. The infection continues to be a major cause of morbidity and mortality in children in developing countries. What is the organism causing the disorder? What is the mode of transfer? With the help of a diagram depict the different stages in the life cycle. (4)

Q8. A very important phase in evolution is endosymbiosis. What would be the outcome if there was no endosymbiosis events? With the help of a diagram depict one of the endosymbiosis outcome. (3)

Q9. Euglena is a protozoa with an exception. How does it differ from the other protozoans? With the help of a diagram depict the origin of Euglena (3)

Q10. Mushrooms propagate by wind dispersal of their spores. What would be the outcome if the spores germinate at the same place? (3)

Q11. Zygomycetes have the characteristic stolons. What are the functions assigned to these structures? One of a zygomycete had a mutation in its genome which resulted in the deletion of these structures. What would be the impact on this fungus? (3)

Q12.Frogs generally get infected with a class of fungus which may result in their deaths. What class of fungus infect these amphibians? With the help of a diagram depict the life cycle of the fungus. (4)

Q13. In a mutated E.coli, the upper arm of the Electron transport chain (ETC) was deleted. In what stage and in what way will this E.coli be affected? (3)

Q14. The photoautotrophs undergo photosynthesis to generate the ATP. What would happen if we remove the reaction centers from these organisms? Purple sulfur bacteria and green sulphur bacteria are the members of this group. Depict the process of reducing power generation in Purple sulphur bacteria. How is it different from the green sulphur bacteria? Depict the differences using the flow diagram. (5)

Q15. In a newly discovered mutant yeast, the glycolytic pathway is shorter because of the presence of a new enzyme that catalyzes the reaction

glyceraldehyde 3-phosphate + H_2O + NAD^+ --> 3-phosphoglycerate+NADH + H^+

Although this mutant enzyme shortens glycolysis by one step, how does it affect anaerobic ATP production? Aerobic ATP production? (2)