8. What is the key difference between primary and secondary sewage treatment?
Ans: Primary (1°) treatment is a physical process that involves for removal of particulate as settelable particle.Secondary (2°) treatment is purely a biological treatment involving microbial oxidation.

9. Do you think microbes can also be used as source of energy? If yes, how?
Ans: Yes, the microbes present in activated sludge are digested anaerobically to generate a biogas i.e. by release of inflammable biogas in biogas plant, which is a source of energy.
Use of microbial culture for SCP (single cell protein).

10. Microbes can be used to decrease the use of chemical fertilizers and pesticides. Explain how this can be accomplished.
Ans: Microbes can be used to decrease the use of chemical fertilizers and pesticides. This can be accomplished by the use of biofertilizers. The main source of biofertilizers are bacteria, fungi and cyanobacteria. They can provide plant nutrients at cheaper cost when compared with the chemical fertilizers. e.g.
(i) Use of leguminous plant with Rhizobium.
(ii) Use of sulphur fixing bacteria.
(iii) Use of hydrogen fixing bacterium.

11. Three water samples namely river water, untreated sewage water and secondary effluent discharged from a sewage treatment plant were subjected to BOD test. The samples were labelled A, B and C; but the laboratory attendant did not note which was which. The BOD values of the three samples A, B and C were recorded as 20 mg/L, 8 mg/Land 400 mg/L, respectively. Which sample of the water is most polluted? Can you assign the correct label to each assuming the river water is relatively clean?
Ans: The sample with BOD value of 400 mg/h is most polluted and should be levelled as B —> untreated sewage river $H_2O$ will be —> less BOD —> 8 mg/L - sample A.
Untreated water → 2° effluent BOD → River water 400 → 20 → 8 and so should be labelled as sample C.

12. Find out the name of the microbes from which Cyclosporin A (an immunosuppressive drug) and Statins (blood cholesterol lowering agents) are obtained.
Ans: Cyclosporin A - Trichoderma polysporum. Statin - Monascus purpureus.

13. Find out the role of microbes in the following and discuss it with your teacher.
(a) Single cell protein (SCP)
(b) Soil
Ans: SCP - single cell protein is microbial yield/cell crop of bacterial, yeast, algae rich in protein. The protein content of microbial cell is very high. Dried cell of Pseudomonas grown on petroleum product has 69% protein and these proteins have all essential amino acids.
Soil : Microbes take part in formation and maintenance of soil. They add organic matter to freshly formed soil. The process is called humification. Some microbes act as biofertilizers and biopesticides.

14. Arrange the following in the decreasing order (most important first) of their importance, for the welfare of human society. Give reasons for your answer.Biogas, Citric acid, Penicillin and Curd.
Ans: Curd: Less important for society - as it depends on individual use and has only nutritions value.
Citric acid : Industrial use, not for dissipation in community.
Penicillin: Medicinal use of microbes, good for health of society, commercially more usable.
Biogas: Most important for community welfare as
(i) it reduces excreta, waste from community.
(ii) it produces inflammable gases, can be used as energy source.
(iii) it is a renewable source.
(iv) it has multidimensional utility.
(v) it is easily maintained and dissipated for community purpose.
So,Penicillin > Biogas > Curd > Citric acid.

15. How do biofertilizers enrich the fertility of the soil?
Ans: Biofertilizers enrich the fertility of the soil by:
(i) replenishment of lost nutrients like $N_2$, phosphorus, iron, sulphur.
(ii) addition of required micronutrients and macronutrients.
(iii) making humus acid compost.
(iv) acting as scavanger.

********** END **********