3 (Sem–6/CBCS) BOT HE 1

2022

BOTANY

(Honours Elective)

Paper : BOT–HE–6016

(Industrial and Environmental Microbiology)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following : ***(any seven)*** 1×7=7

   (a) What is bio-aerosol ?

   (b) Name the bacterium that causes spoilage of canned food.

   (c) Which microorganisms are used in commercial production of citric acid ?

   (d) What is biofilm ?

   (e) Who discovered the fermentation process ?

(f) What are COD and TOC ?

(g) Name *one* airborne human pathogen.

(h) What do you mean by biological augmentation ?

(i) Name *two* heavy metal air pollutants.

(j) What is bioremediation ?

2. Answer ***any four*** of the following : 2×4=8

(a) What is the difference between biodegradation and biodeterioration ?

(b) Why is air not a growth medium for the microorganisms ?

(c) Write the use of settle plate technique.

(d) What is flocculation ?

(e) What is an indicator of pollution ?

(f) Write the difference between submerged and solid state fermentation.

(g) Why are biogeochemical cycles important for nature ?

(h) Write the name and composition of culture medium used for isolation of *Rhizobium*.

3. Answer ***any three*** of the following : 5×3=15

(a) Define N_2-fixation. Write briefly the process of biological N_2-fixation.

(b) Write the techniques used for isolations of AMF from roots and soil.

(c) Write a note on extremophiles.

(d) Mention the use of microbes in petroleum industry.

(e) Describe the process of aseptic packaging of commercial processed food.

(f) Write the career options in microbiology.

(g) Write briefly the commercial production of penicillin.

(h) Write a note on air microflora.

4. Answer ***any three*** of the following : 10×3=30

(a) What is a bioreactor ? Write about the types and typical characteristics of a bioreactor. 1+(3+6)=10

(b) "The immobilized enzyme techniques make the industrial process more economical." Elaborate the above statement and the techniques involved. 2+8=10

(c) What is downstream processing ? Write filtration, solvent extraction and precipitation processes of a fermented target product. 1+(3+3+3)=10

(d) Write about various steps and ex-situ approaches of bioremediation.

(e) Describe the goal of wastewater treatment and the process with special reference to microbial activity. 1+9=10

(f) Describe the common methods for bacteriological analysis of water.

(g) Write the industrial production process of ethanol and its use in various commercial products. 8+2=10

(h) Write briefly how plant-microbe interactions contribute in sustainable agriculture.
