(e) Write briefly the screening process of microbes used in industries. Why is secondary screening important? 8+2=10

(f) Describe the scope and application of Microbes in biotechnology and other branches of biology.

Total number of printed pages–4

3 (Sem–6/CBCS) BOT HE 1

2023

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 : 1×7=7

(a) Who coined the term 'antibiotic'?

(b) What is the role of leg-haemoglobin in N_2-fixation?

(c) Mention *any two* advantages of immobilized enzymes used in fermentation.

(d) Name *one* microorganism used in commercial production of lipase.

(e) What is biosorption ?

(f) What is 'Hartig net' ?

(g) Name *one* air-borne bioallergen.

2. Answer the following in short : 2×4=8

(a) Why is impeller or agitator called as a key component of a bioreactor ?

(b) Write *one* isolation method of soil microorganisms.

(c) Define synthetic media. Write the composition of *any one* synthetic medium.

(d) How was water pollution related to 'Minamata' disease in Japan ?

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

(a) Characteristics of Microbes used in industrial microbiology

(b) Air-lift bioreactor

(c) Basic components of a fermentation medium

(d) Indicators of water pollution

(e) Screening of Microbes for casein hydrolysis

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

(a) Define fermentation. Write briefly about solid state and liquid state fermentations and also mention their various uses in industries. 1+(4+4+1)=10

(b) What is mycorrhiza ? Write about the different types of mycorrhiza. Describe the contribution of arbuscular mycorrhizal fungi in agriculture. 2+4+4=10

(c) Write about the commercial production of citric acid and its use in various industries. 8+2=10

(d) Write an essay on bioremediation of contaminated soil. Discuss its advantages and disadvantages. 8+2=10

Or

Write the definition and formula for calculation of standard deviation. What is the significance of standard deviation in biological studies ? Write the merits and demerits of standard deviation.

2+2+2+2+2=10

(c) What are the types of Gel Electrophoresis ? Describe different steps involved in Agarose Gel Electrophoresis process for extraction of DNA from plant material. Mention the factors affecting electrophoresis.

1+6+3=10

Or

What is Cryofixation ? Describe different types of cryofixations used in biological studies. How cryofixation is necessary for biological studies ?

2+6+2=10

Total number of printed pages–4

3 (Sem–6/CBCS) BOT HE 2

2023

BOTANY

(Honours Elective)

Paper : BOT–HE–6026

(Analytical Techniques in Plant Sciences)

Full Marks : 60

Time : Three hours

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

1. Answer the following questions very briefly : 1×7=7

(a) What do you mean by arrayed data ?

(b) Name the scientist who first created the scanning electron microscope.

(c) Paper chromatography is an example of liquid-liquid/liquid-solid chromatography.

(Choose the correct option)

(d) Succinate dehydrogenate is the enzyme marker for which cell organelle ?

(e) In X-ray crystallography, _____ is used to position the crystal in desired orientation. *(Fill in the blank)*

(f) What are the limitations of chromosome painting ?

(g) Silver (Ag) atom is used for image formation in _____. *(Fill in the blank)*

2. Give very short answers of the following questions : 2×4=8

(a) Do all chromosomes have same banding pattern ? Give reasons.

(b) Mention *two* precautions that need to be taken during preparation of chromatographic plates in TLC.

(c) What is X-ray crystallography ?

(d) Application of Spectrophotometry in biological research.

3. Write short notes on ***any three*** of the following : 5×3=15

(a) PAGE

(b) Freeze fracture technique of electron microscopy

(c) Autoradiography

(d) Differentiate between differential and density gradient centrifugation.

4. Write answer of the following questions : 10×3=30

(a) What do you mean by column chromatography ? What is the working principle of column chromatography ? Describe the procedure of this kind of chromatography and the precautions to be taken while doing this technique. 1+2+5+2=10

Or

Write short notes on the following : 5×2=10

(i) Application of flow cytometry

(ii) Ion exchange chromatography

(b) Write the definition of the following along with their merits and demerits : 5×2=10

(i) Median

(ii) Mode