

94173

B.Sc. 6th Semester (New Scheme)

Examination, December-2022

BIO-TECHNOLOGY

Paper-BT-603

Bio Process Technology

*Time allowed : 3 hours]*

*[Maximum marks : 40*

**Note :** *Question No. 1 is compulsory and attempt any four questions selecting one question from each unit given below. All questions carry equal marks.*

1. Write short notes on these :  $8 \times 1 = 8$

(a) Recombinant products

(b) Secondary Metabolite

(c) Sterilization

(d) Industrial strains

(e) Biosensor

(f) Automatic control

(g) Industrial Effluents

(h) Packaging and Labeling

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[P.T.O.]

**Unit-I**

2. What is bioprocess technology? Describe the applications of bioprocess technology. 8
3. Write the notes on : 2×4=8
- (a) Chronological development of bioprocess technology
- (b) Batch, Fed-batch and Continuous culture

**Unit-II**

4. What is the medium? Describe the various components of the culture medium in detail. 8
5. Write the notes on any *two* : 2×4=8
- (a) Baffles
- (b) Aeration system of bioreactor
- (c) Development of inoculum

**Unit-III**

6. Describe the various applications of the computer system in bioprocess industries. 8
7. Write the notes on : 2×4=8
- (a) Control system of Bioreactor
- (b) Mass transfer Coefficient

## Unit-IV

8. What is the downstream process? Describe the various steps required for the product recovery in the bioreactor. 8
9. Write the notes on any *two* : 2×4=8
- (a) Microbial production of Ethanol
  - (b) Amylase production
  - (c) Single-cell proteins

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B.Sc. 6th Semester (New Scheme)

Examination, December-2022

BIO-TECHNOLOGY

Paper-BT-605/BIN-604

Physical Chemistry

Time allowed : 3 hours] [Maximum marks : 40

Note : Attempt five questions in all, selecting one question from each section. Question No. 1 is compulsory.

1. (a) In which region electron band spectrum is observed?
- (b) What is cold light?
- (c) What is "Bathochromic shift" in absorption of light by solution?
- (d) Why molality is preferred over molarity?
- (e) What are isotonic solutions?
- (f) Define invariant system.
- (g) Give applications of eutectics.
- (h) When is the value of Van't Hoff factor more than one?

8×1=8

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[P.T.O.]

## Section-A

2. (a) Explain Franck-Condon Principle. 3
- (b) Describe the different possible electronic transitions between  $\sigma$ ,  $\pi$ ,  $\eta$  and  $\pi^*$  orbitals. 3
- (c) What do you understand by Gerade and Ungerade orbitals? 2
3. (a) Discuss the salient features observed in the electronic spectrum of a diatomic molecule. 4
- (b) What are chromophore? Which type of electronic transition take place in them among the orbitals and why? 4

## Section-B

4. (a) Write explanatory notes on Grothaus-Draper Law and Lambert-Beer's Law. 4
- (b) Briefly explain Fluorescence and Phosphorescence using Jablonski diagram. What is difference between them? 4
5. (a) Give mechanism of photosynthesis of HCl explaining why quantum yield of this reaction is very high. 4

- (b) Write notes on : 4
- (i) Photosensitization
  - (ii) Photoinhibitors

### Section-C

6. (a) What is osmotic pressure? How do you explain that it is a colligative property? 4
- (b) What is the cause of : 4
- (i) elevation in boiling point
  - (ii) depression in freezing point

Explain with the help of vapour pressure temperature curve.

7. (a) Distinguish between : 4
- (i) Hypotonic and hypertonic solutions
  - (ii) Positive and negative azeotropes
- (b) Give reasons : 4
- (i) Gargling with  $\text{NaCl}$  solution gives relief in tonsils.
  - (ii) Why equimolar solutions of  $\text{NaCl}$  and cane sugar doesn't have same osmotic pressure?

**Section-D**

8. (a) Explain the terms : 3
- (i) Trippl point
  - (ii) Eutectic point
  - (iii) Degree of freedom
- (b) Draw well-labelled phase diagram of a lead-silver system and discuss desilverisation of lead on this basis. 5
9. (a) Define Gibbs phase rule. How can it be derived thermodynamically? 4
- (b) Draw phase diagram of water system. What do you interpret from the slope of the melting point curve? 4

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B.Sc. 6th Semester New Scheme Examination,

December-2022

BIOTECHNOLOGY

Paper-BT-606/BIN-606

Organic Chemistry

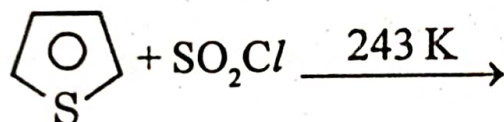
Time allowed : 3 hours ]

[ Maximum marks : 40

*Note : Attempt any five questions, selecting one question from each section. Question No. 1 is compulsory.*

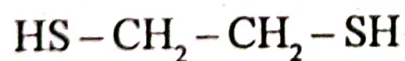
1. (a) Why pyridine is water soluble but pyrrole is not ?

(b) Complete the reaction :



(c) What happens when pyrrole is treated with methyl iodide.

(d) Write IUPAC name of



(e) What are active methylene compounds ?

(f) What is difference between nylon-6 and nylon-6,6 ?

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[P.T.O.]



- (g) Which amino acids enlist mainly in cationic form ?
- (h) What are conjugated proteins ?

### Section-A

2. (a) Why is thiophene more aromatic in nature than furan ? 3
- (b) Give two methods of preparation of pyrrole. 2
- (c) Give the resonance and orbital picture of pyridine. 3
3. (a) Write a note on orientation of nucleophilic substitution in heterocyclics (five membered only). 3
- (b) How will you synthesize 2, 4, 6, .... Trimethylpyridine. 2
- (c) Compare basic character of pyridine, piperidine and pyrrole. 3

### Section-B

4. (a) Discuss Skraup synthesis along with its mechanism. 4

- (b) Why electrophilic substitution reaction in quinoline occurs preferentially at position -5 and position -8. 4
5. (a) Which is a stronger acid ? 2
- (i)  $C_6H_5SO_3H$
- (ii)  $C_6H_5COOH$ . Explain:
- (b) How are sulphonamides prepared ? Explain their acidic behaviour. 3
- (c) What are detergents ? Why they are better than soaps. Explain. 3

### Section-C

6. (a) What is Claisen condensation ? Discuss its mechanism. 4
- (b) How will you prepare succinic acid from ethyl acetoacetate. 4
7. (a) How are teflon and terylene synthesized ? Give their uses. 4
- (b) Give brief description of natural and synthetic rubbers. How vulcanization improve their properties. 4

## Section-D

8. (a) Explain isoelectric point with reference to  $\alpha$ -amino acids. Do all amino acids have same isoelectric points ? Explain. 4
- (b) How will you prepare 4
- (i) Glycine (ii) Phenylalanine
9. (a) Discuss briefly the methods used to determine primary structure of protein. 4
- (b) What are proteins ? Explain their biological function. 4