

Bachelor of Science (B.Sc.) Semester—III Examination
MICROBIOLOGY—INDUSTRIAL MICROBIOLOGY (New)

Optional Paper—II

Time : Three Hours]

[Maximum Marks : 50

N.B. :— (1) All questions are compulsory and carry equal marks.

(2) Draw well labelled diagram whenever necessary.

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|----|---|----|
| 1. | Describe various methods of Primary Screening. | 10 |
| | OR | |
| | Draw well labelled diagram of fermentor and describe various parts of fermentor. | 10 |
| 2. | Describe various techniques of stain development and its applications. | 10 |
| | OR | |
| | Discuss various raw materials of carbon and nitrogen source used in fermentation media. | 10 |
| 3. | (a) Explain methods of centrifugation for product recovery. | 5 |
| | (b) Discuss Ion exchange chromatography and its application. | 5 |
| | OR | |
| | (c) Explain principle and applications of Fractional Distillation. | 5 |
| | (d) Discuss concept of Good Manufacturing practices. | 5 |
| 4. | (a) Write a note on raw materials used in beer production. | 2½ |
| | (b) Explain recovery of spirulina production and give its medicinal application. | 2½ |
| | (c) Write a note on semi synthetic penicillin. | 2½ |
| | (d) Explain Biochemistry of Ethanol production. | 2½ |
| | OR | |
| | (e) Write a note on recovery of baker's yeast. | 2½ |
| | (f) Explain various types of wine. | 2½ |
| | (g) Discuss biochemistry of Citric Acid production. | 2½ |
| | (h) Draw flow sheet diagram of Penicillin. | 2½ |
| 5. | Solve any Ten : | |
| | (i) Define industrial microbiology. | 1 |
| | (ii) Give two examples of industrially important Microorganisms. | 1 |
| | (iii) What is submerged fermentor ? | 1 |
| | (iv) Give one example of mutagen. | 1 |
| | (v) What is inoculum development ? | 1 |
| | (vi) What is scale up ? | 1 |
| | (vii) What is long form of USP ? | 1 |
| | (viii) Give any one method of purification. | 1 |
| | (ix) Write role of IP in Industrial microbiology. | 1 |
| | (x) Write two applications of ethanol. | 1 |
| | (xi) Write two applications of Citric Acid. | 1 |
| | (xii) Give the full form of SCP. | 1 |

NRT/KS/19/2088

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[Maximum Marks : 50

Note :— (1) All questions are compulsory and carry equal marks.

(2) Draw well labelled diagrams wherever necessary.

1. Describe various methods of primary screening of industrially important microorganisms. 10
OR
Discuss the process of sterilization of air, production media and fermenter. 10
2. Draw a well labelled diagram of a typical fermenter and describe its various parts. 10
OR
Describe different types of fermentation process with suitable examples. 10
3. (a) Write a brief account of any two raw materials used as carbon sources in media preparation. 5
(b) Explain any one method of cell recovery from fermented media with example. 5
OR
(c) Explain the process of inoculum build up for the fermentation process with example. 5
(d) Explain Scale up process. 5
4. (a) Give the biochemistry of ethanol production. 2½
(b) Explain the terms malting and mashing. 2½
(c) Write a note on semisynthetic Penicillin. 2½
(d) Draw a flow sheet diagram of wine production. 2½
OR
(e) What is SCP ? Write a note on its uses. 2½
(f) Give the flow sheet diagram of vit B₁₂ production. 2½
(g) Write a note on types of Wine. 2½
(h) Explain the recovery of citric acid from fermented broth. 2½
5. Solve any **ten** (1 mark each) :—
 - (i) Mention any two objectives of secondary screening. 1
 - (ii) What is a Mutagen ? Give one example. 1
 - (iii) Give one scope of industrial microbiology. 1
 - (iv) Name any two factors affecting fermenter design. 1
 - (v) What is Surface Fermentation ? 1
 - (vi) Why there is a need to keep a head space in the fermenter ? 1
 - (vii) What is sulphite waste liquor ? 1
 - (viii) What is down stream processing ? 1
 - (ix) Name the hydrocarbons used as raw material in fermentation media. 1
 - (x) Name the yeast commonly used in SCP production. 1
 - (xi) Name the raw materials used in citric acid production. 1
 - (xii) What are Hop cones ? 1

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Optional Paper-II

Time : Three Hours

[Maximum Marks : 50

- N.B. :-** (1) All questions are compulsory and carry equal marks.
 (2) Draw diagram wherever necessary.

- | | |
|---|----|
| 1. Discuss different types of fermenters. | 10 |
| OR | |
| Describe the methods of primary screening of organism that produce growth factors. | 10 |
| 2. Discuss the process of sterilization of fermenter, production media and air. | 10 |
| OR | |
| Discuss various factors affecting fermentation process. | 10 |
| 3. (a) What is downstream processing ? Explain ion exchange chromatographic technique for product recovery. | 5 |
| (b) Describe centrifugation method for separation of cells from fermentation media. | 5 |
| OR | |
| (c) What are the principles of Good manufacturing practices ? | 5 |
| (d) Describe in detail The sterility test for sterile pharmaceutical product as per USP. | 5 |
| 4. (a) Write advantages of SCP. | 2½ |
| (b) Draw flow diagram of production of Baker's yeast. | 2½ |
| (c) Give Biochemistry of ethanol production. | 2½ |
| (d) Write a note on semisynthetic penicillins. | 2½ |
| OR | |
| (e) Give the flow sheet diagram of citric acid production. | 2½ |
| (f) Discuss the significance of hop flowers in beer production. | 2½ |
| (g) Write a note on different types of wine. | 2½ |
| (h) Discuss the recovery process of penicillin. | 2½ |

5. Solve any TEN :—

- (i) What is baffle ?
- (ii) What is a sparger ?
- (iii) Give one example of antifoaming agent.
- (iv) Give any two examples of mutagenic agent used in strain development.
- (v) What is scale up ?
- (vi) What is black strap molasses ?
- (vii) What is fractional distillation ?
- (viii) What is IP ?
- (ix) Write any two methods for harvesting biomass.
- (x) Give any one example of single cell protein.
- (xi) What is active dry yeast ?
- (xii) Write any one organism used in penicillin production.

1×10=10

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
End Semester Examination (ODD Semester) Winter-2022
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Bachelor of Science (B.Sc.) Semester-III Examination
MICROBIOLOGY PAPER-II: INDUSTRIAL MICROBIOLOGY

Time: Three Hours

(Maximum Marks: 50)

Note: (1) All questions are compulsory and carry equal marks.

(2) Draw diagram wherever necessary.

1. Describe in detail types of fermentation process. 10

OR

Describe in detail history and scope of industrial microbiology 10
2. Describe the raw material used for media preparation and scale up of fermenter process. 10

OR

(a) Write note on strain development 5
(b) Describe the process of Inoculum development. 5
3. Describe in detail outline of downstream process. 10

OR

(a) Describe the product recovery and purification. 5
(b) Write short note on concept of good manufacturing practice. 5
4. Describe in detail the of production single cell protein - spirulina. 10

OR

Writeshortnoteson:
a) Ethanol production 5
b) Baker's yeast 5
5. Solve any **ten** of the following: (1x10)=10
 - (I) Write note on scope of industrial microbiology?
 - (II) Define isolation of primary screening?
 - (III) What is meant by media preparation?
 - (IV) Define Inoculum development.
 - (V) Write any two factor affecting fermentation process.
 - (VI) Name any two raw material used for media preparation?
 - (VII) Define term recovery?
 - (VIII) What is meant by downstream processing.
 - (IX) Define the harvesting of biomass.
 - (X) What are different substrates used for ethanol production.
 - (XI) Name the micro-organism used in baker's yeast.
 - (XII) Which substance is used in the fermentation of citric acid?

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MICROBIOLOGY PAPER-II: INDUSTRIAL MICROBIOLOGY

Time: Three Hours

(Maximum Marks: 50)

Note: (1) All questions are compulsory and carry equal marks.
(2) Draw diagram wherever necessary.

1. Describe in detail isolation of primary screening and secondary screening 10

OR

Write note on types and parts of fermenter 10
2. Describe the Scale up processing in fermenter process. 10

OR

(a) Write note on raw material used for media preparation 5
(b) Describe the factors affecting in fermentation process. 5
3. Describe the harvesting of biomass –method and principle 10

OR

(a) Describe the outline of downstream process. 5
(b) Write short note on quality checking. 5
4. Describe in detail the of ethanol production 10

OR

Write short notes on
a) Spirulina production 5
b) Penicillin production 5
5. Solve any ten of the following: 1×10=10
 - (I) Define industrial microbiology
 - (II) Define type of fermenter?
 - (III) Write any two industrially important micro organisms.
 - (IV) Define scale up process.
 - (V) Write note on agitation.
 - (VI) Define strain development
 - (VII) Write any two raw material use in fermentation process.
 - (VIII) What is meant by product recovery?
 - (IX) Define the biomass.
 - (X) What are different raw materials used for ethanol production.
 - (XI) Write name of micro-organism use on baker's yeast
 - (XII) Write use of penicillin.