

Name:

Enrolment No:



UPES

End Semester Examination, December 2023

Course: Fermentation Technology

Semester : III

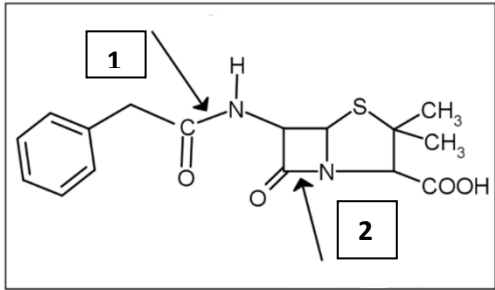
Program: MSc. Microbiology

Duration : 3 Hours

Course Code: HSMB 8002

Max. Marks: 100

Instructions:

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	Cos
Q 1	Define biotransformation. Cite an example where biotransformation is used.	1.5	CO3
Q 2	Cite a reason why biotransformation is different from regular fermentation.	1.5	CO3
Q3	Differentiate between biochemical and chemical reactions.	1.5	CO2
Q4	There are two arrows in the figure where two enzymes act, write the names of the enzymes 1 and 2. 	1.5	CO1
Q5	Which of the following carbohydrates are mainly present in whey? a) Glucose b) Lactose c) Fructose	1.5	CO2

	d) Sucrose		
<b>Q6</b>	Write one commercial use of protease.	<b>1.5</b>	<b>CO1</b>
<b>Q7</b>	Name the enzyme used in stone-washing of denims.	<b>1.5</b>	<b>CO1</b>
<b>Q8</b>	Industrial enzyme commonly used in cheese making is called .....	<b>1.5</b>	<b>CO1</b>
<b>Q9</b>	Name two commercially relevant strains for production of Glutamic acid	<b>1.5</b>	<b>CO1</b>
<b>Q10</b>	Draw a biomass pyramid.	<b>1.5</b>	<b>CO1</b>
<b>Q11</b>	'Auxotrophs are useful to fermentation industry.' Justify the statement.	<b>1.5</b>	<b>CO3</b>
<b>Q12</b>	Which fermentation process is most useful for production of glutamic acid? a. Batch b. Fed-batch c. Continuous d. All of the above	<b>1.5</b>	<b>CO3</b>
<b>Q13</b>	Why is lignocellulose a source of sustainable fermentation media?	<b>1.5</b>	<b>CO2</b>
<b>Q14</b>	'Microbial fermentation produces D optical isomers of the amino acids.' Justify the statement.	<b>1.5</b>	<b>CO3</b>
<b>Q15</b>	Arrange in the order of ease of use by microbes : Glucose, Fructose, Sucrose, Starch, Lignocellulose	<b>1.5</b>	<b>CO2</b>
<b>Q16</b>	What is scientific name of Hops?	<b>1.5</b>	<b>CO1</b>
<b>Q17</b>	Why are Hops used in fermentation of Beer?	<b>1.5</b>	<b>CO2</b>
<b>Q18</b>	The following process in fermentation is most expensive:  a. Microbiology ---isolating strain b. Developing fermentation process c. Extraction and recovery of product d. Packaging and reaching the market	<b>1.5</b>	<b>CO2</b>
<b>Q19</b>	What is the alcohol content in beer? a) 3-8% b) 10-27% c) 60-70% d) 95%	<b>1.5</b>	<b>CO2</b>
<b>Q20</b>	The best medium for the production of Penicillin is  a. Nutrient agar b. Corn steep liquor c. Sulfite waste liquor d. Whey	<b>1.5</b>	<b>CO2</b>

**Section B**  
**(4Qx5M=20 Marks)**

<b>Q 1</b>	<p>Following is a flow chart of a generalized fermentation process. Complete the flow chart by labeling each step from inoculum to product.</p>	<b>5</b>	<b>CO1</b>
<b>Q2</b>	Define auxanography. Where is it used?	<b>5</b>	<b>CO2</b>
<b>Q3</b>	What is enrichment? How is it useful in fermentation technology?	<b>5</b>	<b>CO2</b>
<b>Q4</b>	Enlist some methods of preservation of culture. Explain 1-2 in detail.	<b>5</b>	<b>CO1</b>

**Section C**  
**(2Qx15M=30 Marks)**

<b>Q 1</b>	<p>With the help of graph below; infer the following:</p> <p>(i) What do you infer from the graph with regards to – Streptomycin production, growth of production strain, Glucose conc., pH and duration of fermentation? (5)</p> <p>(ii) What type of product is streptomycin --- a primary or a secondary metabolite? (1)</p> <p>(iii) Name the production strain of Streptomycin. (1)</p> <p>(iv) What type of fermentation process with regards to batch, fed batch or continuous is useful for Industrial production of antibiotics and why? (2)</p>	<b>15</b>	<b>CO3</b>
------------	---	-----------	------------

	(v) With the help of flow chart and text; write the industrial fermentation of Penicillin. (6)		
<b>Q2</b>	<p>‘At the end of a long fermentation in a batch reactor, single cell proteins (Candida cells) were harvested. It was later realized that the fermentation produce had toxins because the growth went into stationary phase.’ Based on your knowledge of fermentation technology; answer the following:</p> <p>(i) What corrective measures should be done or fermentation procedure be resorted to so as to make single cell proteins fit for human consumption? (1)</p> <p>(ii) How does a batch reactor graph look like compared to a continuous one? (2)</p> <p>(iii) What are different types of fermenter configurations and their uses? (8)</p> <p>(iv) Draw a well labeled typical stir tank reactor. (4)</p>	<b>15</b>	<b>CO3</b>
<b>Section D</b> <b>(2Qx10M=20 Marks)</b>			
<b>Q 1</b>	<p>With the help of flow chart and text; demonstrate the types and industrial fermentation of Beer. (8)</p> <p>Mention about the adjuvants and their role. (2)</p>	<b>10</b>	<b>CO2</b>
<b>Q2</b>	<p>Recall the key ingredients in production media. (2) Highlight the different types of production media. (7) How is the choice of production media made? (1)</p>	<b>10</b>	<b>CO1</b>