

Name:

Enrolment No:



UPES

End Semester Examination, December 2023

Course: Fermentation Technology

Semester : V

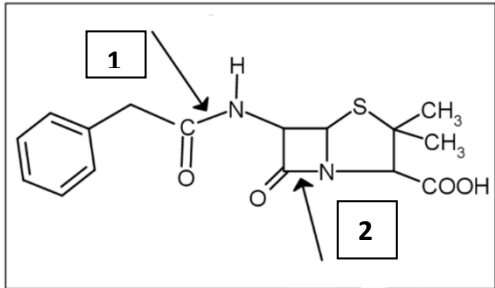
Program: BMSc. Microbiology

Duration : 3 Hours

Course Code: HSMB 3015

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 d) Sucrose	1.5	CO2
Q6	Name one commercial use of rennin.	1.5	CO1
Q7	Name the enzyme used in stone-washing of denims.	1.5	CO1

Q8	Industrial production of Citric acid is done by a. Aspergillus niger b. Candida c. Penicillium d. All of the above	1.5	CO1
Q9	Name two commercially relevant strains for production of Glutamic acid	1.5	CO1
Q10	Draw a biomass pyramid.	1.5	CO1
Q11	'Auxotrophs are useful to fermentation industry.' Justify the statement.	1.5	CO3
Q12	Which fermentation process is most useful for production of glutamic acid? a. Batch b. Fed-batch c. Continuous d. All of the above	1.5	CO3
Q13	For thorough mixing of medium of medium and inoculum the part of fermenter useful is a. Shaft b. Headspace c. Impeller d. Sparger	1.5	CO2
Q14	'Microbial fermentation produces D optical isomers of the amino acids.' Justify the statement.	1.5	CO3
Q15	Arrange in the order of ease of use by microbes: Glucose, Fructose, Sucrose, cellulose, Lignocellulose	1.5	CO2
Q16	What is scientific name of Hops?	1.5	CO1
Q17	Why are Hops used in fermentation of Beer?	1.5	CO2
Q18	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	1.5	CO2
Q19	During fermentation; space is left at the top of reactor. The space is called: a. Shaft b. Head space c. Orifice d. Sparger	1.5	CO2
Q20	The best medium for the production of Penicillin is	1.5	CO2

	a. Nutrient agar b. Corn steep liquor c. Sulfite waste liquor d. Whey		
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Section B
(4Qx5M=20 Marks)

Q 1	Derive Monod relation? How is it applied in fermentation biology?	5	CO3
Q2	Define auxanography. Where is it used?	5	CO2
Q3	What is enrichment? How is it useful in fermentation technology?	5	CO2
Q4	Elaborate methods of sterilizing media and fermenter.	5	CO1

Section C
(2Qx15M=30 Marks)

Q 1	<p>With the help of graph below; infer the following:</p> <p>(i) What do you infer from the graph with regards to – Penicillin production, growth of production strain, Sugar conc., and duration of fermentation? (5)</p> <p>(ii) What type of product is Penicillin --- a primary or a secondary metabolite? (1)</p> <p>(iii) Name the production strain of Penicillin. (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> <p>(v) With the help of flow chart and text; write the process of industrial fermentation of Penicillin. (6)</p>	15	CO3
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Q2	<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? (7)</p> <p>(iv) Draw a well labeled typical stir tank reactor. (5)</p>	15	CO2
<p>Section D (2Qx10M=20 Marks)</p>			
Q 1	<p>Define enzyme immobilization. (1) What are ways by which enzymes are immobilized? (7) Name one successful immobilized enzyme in commercial use and its application.(2)</p>	10	CO1
Q2	<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>	10	CO1